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**SOUTHERN CALIFORNIA PARTYBOAT SAMPLING STUDY  
QUARTERLY REPORT NO. 12**

**April 1 - June 30, 1978**

**by**

**Stephen J. Crooke**

**MARINE RESOURCES**

**Administrative Report No. 79-12**

**August 1979**

SOUTHERN CALIFORNIA PARTYBOAT SAMPLING STUDY

QUARTERLY REPORT NO. 12<sup>1/</sup>

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Stephen J. Crooke<sup>2/</sup>

ABSTRACT

Between April 1 and June 30, 1978, Departmental personnel sampled catches during 148 trips aboard commercial passenger fishing vessels operating in southern California. A total of 29,374 fishes representing 97 species were identified and measured. Otoliths for age determination studies were removed from 72 rockfish carcasses representing 11 species. In addition, nine long-range trips originating in San Diego and fishing in Mexican waters were sampled. A total of 1,190 fishes comprising 21 species was identified and measured at dockside from these vessels.

The 10 most commonly taken species during the quarter accounted for 76.9% of the southern California catch. The most frequently sampled species were kelp bass, *Paralabrax clathratus* (21.1%); bocaccio, *Sebastes paucispinis* (15.5%); Pacific mackerel, *Scomber japonicus* (13.1%); white croaker, *Genyonemus lineatus* (6.0%); chilipepper, *Sebastes goodei* (4.8%); California barracuda, *Sphyraena argentea* (4.5%); kelp rockfish, *Sebastes atrovirens* (3.6%); barred sand bass, *P. nebulifer* (3.2%); halfmoon, *Medialuna californiensis* (2.6%); and blue rockfish, *S. mystinus* (2.6%).

Data gathered from long-range vessels fishing off Baja California showed the top five species accounted for 94.0% of the fish sampled. The most frequently sampled species were yellowfin tuna, *Thunnus albacares* (34.4%); yellowtail, *Seriola dorsalis* (28.7%); wahoo, *Acanthocybium solanderi* (22.9%); snowy grouper, *Epinephelus niveatus* (5.9%); and leather bass, *E. dermatolepis* (2.0%).

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Operations Research Branch, California State Fisheries Laboratory, 350 Golden Shore, Long Beach, California 90802.

# SOUTHERN CALIFORNIA PARRYBOAT SAMPLING STUDY

## QUARTERLY REPORT NO. 12

### INTRODUCTION

Between April 1 and June 30, 1978, Departmental personnel sampled catches during 148 trips aboard commercial passenger fishing vessels operating in southern California. A total of 29,374 fishes representing 97 species were identified and measured.<sup>3/</sup> Otoliths for age determination studies were removed from 72 rockfish carcasses representing 11 species. In addition, nine long-range trips originating in San Diego and fishing in Mexican waters were sampled. A total of 1,190 fishes comprising 21 species was identified and measured at dockside from these vessels.

The 10 most commonly taken species during the quarter accounted for 76.9% of the southern California catch (Table 1). The most frequently sampled species were kelp bass, *Paralabrax clathratus* (21.1%); bocaccio, *Sebastes paucispinis* (15.5%); Pacific mackerel, *Scomber japonicus* (13.1%); white croaker, *Genyonemus lineatus* (6.0%); chilipepper, *Sebastes goodei* (4.8%); California barracuda, *Sphyræna argentea* (4.5%); kelp rockfish, *Sebastes atrovirens* (3.6%); barred sand bass, *P. nebulifer* (3.2%); half-moon, *Medialuna californiensis* (2.6%); and blue rockfish, *S. mystinus* (2.6%).

Data gathered from long-range vessels fishing off Baja California showed the top five species accounted for 94.0% of the fish sampled (Table 2). The most frequently sampled species were yellowfin tuna, *Thunnus albacares* (34.4%); yellowtail, *Seriola dorsalis* (28.7%); wahoo, *Acanthocybium solanderi* (22.9%); snowy grouper, *Epinephelus niveatus* (5.9%); and leather bass, *E. dermatolepis* (2.0%).

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For definition of length measurements see Maxwell and Schultze, Administrative Report 76-3.

## ROCKFISHES

During the quarter 11,670 rockfishes (*Sebastes* spp.) representing 37 species were identified (Table 3). The group accounted for 39.8% of the fishes taken. Throughout the previous quarter they accounted for 70.5% of the catch while during the same quarter in 1977 they comprised 39.2% of the take. The dramatic drop in the importance of rockfishes from last quarter was due to sportboats switching from rockcod to surface fishing as summer approached. No significant changes were noted in species composition between this quarter and the same period last year. The top 10 species of rockfishes comprised 87.5% of the sampled catch, up 1.1% from the same quarter in 1977 but down 1.5% from the previous reporting period.

Bocaccio was the most frequently measured rockfish accounting for 38.9% of the take. During the same quarter last year it accounted for 29.0% of the catch while throughout the previous quarter it accounted for 29.9% of the catch. Increased bocaccio catches could probably be attributed to the strong 1976 year class, represented by a mode at 25 cm, which is now fully recruited to the fishery (Figures 1-3). There was a 4.8 cm decrease in the average length of bocaccio when comparing this quarter ( $\bar{x}$  length = 41.8 cm) with the same period last year ( $\bar{x}$  length = 46.6 cm). There was also a decline in the average size of fish taken from the previous quarter ( $\bar{x}$  length = 45.3 cm). The reduction in mean length can be attributed to the large contribution the 1976 year class made to the catch. Data on chilipepper show the average size was 40.4 cm while last quarter it was 34.8 cm (Figures 4-6). No data are available for the same quarter in 1977. Kelp rockfish catches for the quarter were fairly stable with a mode distributed around 31-32 cm (Figures 7-9). No data are available for the previous quarter or the same period a year ago. Blue rockfish taken

during the quarter averaged 29.3 cm in length (Figures 10-12) while those taken last quarter averaged 24.5 cm. No data are available for the same quarter in 1977.

#### SURFACE GAMEFISHES

Five surface gamefishes accounted for 44.5% of the fish measured. This represented a 5.6% decline in importance from the same quarter in 1977 when the top five accounted for 50.1% of the catch. Declining catches of bonito (*Sarda chiliensis*) during 1978 were responsible for this phenomenon. The decline would have been much greater if kelp bass and Pacific mackerel catches had not increased by 216%.

Kelp bass measured during the quarter averaged 32.5 cm in length (Figures 13-15) while those taken during the same quarter last year averaged 35.0 cm. Length histograms from 1977 and 1978 showed that fewer short fish (under 30.5 cm) were taken in 1977, a condition which could have explained the decreased size this quarter. Large numbers of small fish would have also explained why the average length dropped when comparing this quarter to the previous one ( $\bar{x}$  length = 34.1 cm). Pacific mackerel catches continued to reflect the dominance of the 1974 and 1976 year classes as well as the emergence of the 1977 year class (Figures 16-18). The 1974 year class was represented by a mode at 40-41 cm, the 1976 year class at 33-34 cm, and the 1977 year class at 25-27 cm.

Barracuda, *Sphyraena argentea*, catches continued to be dominated by the 1974 year class as evidenced by a mode at 68-70 cm in length during May and June (Figures 19-21). The 1976 year class appeared in sufficient numbers to be noticed during April (represented by a mode at 55 cm) and by June it was making significant contribution to the fish measured. Lack of a mode at 60-61 cm was indicative of the failure of the 1975 year class.

Throughout the quarter, the average length for sand bass increased each month (Figures 22-24). However, the average length for the quarter ( $\bar{x}$  length = 35.5 cm) dropped 2.3 cm from the same period in 1977 when it was 37.8 cm. No data were available for comparing this quarter to the previous one. The average length for halfmoons fluctuated by 2.2 cm over the three month period (Figures 25-27). No data were available from previous quarters for comparison. Bonito catches were dominated by I and II year old fish during April and by I's throughout May and June (Figures 28-30). During the same quarter last year, I's were dominant with no II's present. Data from the previous quarter showed that I's and II's were present only during February. White croakers measured during the quarter averaged 26.8 cm (Figures 31-33). No data were available from previous quarters.

#### BAJA CALIFORNIA FISHERY

The average length of yellowfin tuna taken during the quarter was 79.7 cm (Figures 34-36). This represented a decrease of 4.0 cm from last quarter's average of 84.0 cm. Smaller fish taken during June were responsible for this since fishing effort switched from the Revilla Gigedo Islands to an area off southern Baja California. Yellowtail (Figures 37-39) averaged 92.1 cm for the quarter, an increase of 5.7 cm from the previous quarter ( $\bar{x}$  length = 86.4). Good fishing for large yellowtail at Alijos Rocks during June was responsible for the size increase. There was a 10.1 cm increase in the size of wahoo (Figures 40-42) taken this quarter ( $\bar{x}$  length = 128.8 cm) versus those measured the previous quarter ( $\bar{x}$  length = 118.7 cm). The increase in size can be associated with the previously mentioned switch in areas fished. Snowy groupers averaged 74.6 cm in length (Figures 43 & 44) with most fish taken during June in the Uncle Sam

region. The month of April yielded significant catches of leather bass at the Revilla Gigedo Islands. Those fish measured averaged 63.2 cm in length (Figure 45) with a large range in sizes.

#### EFFORT AND CATCH-PER-UNIT-EFFORT

The average number of anglers per trip (Effort) showed a wide degree of variation during the quarter (Table 4). Excellent weather throughout May was probably responsible for the increase in the number of passengers during the month. The decline in the number of passengers in June is counter to an upward trend displayed in previous years (Tables 4 & 5). This was probably due to a post-season letdown following the early arrival of summer-like weather in May.

Catch-per-unit-effort for the entire quarter was greater than during the same periods in 1976 and 1977. As previously mentioned, excellent catches of kelp bass and Pacific mackerel are responsible for this. During April, the CPUE was up 30% from the same month during 1977. May increased by 48% when compared with the previous high for the same month recorded last year. The CPUE fell during June but still remained 30% above the figure reported in June 1977.

#### REFERENCES

- Crooke, Stephen J., and Donald F. Schultze. 1977. Southern California partyboat sampling study, quarterly report no. 8. Calif. Dept. Fish and Game, Mar. Res. Admin. Rept., 77-19:1-24.
- Crooke, Stephen J. 1978. Southern California partyboat sampling study, quarterly report no. 11. Calif. Dept. Fish and Game, Mar. Res. Admin. Rept., 78-15:1-51.

TABLE 1. Number of Fishes Measured from Southern California Partyboats, April through June 1978.

Common name	Scientific name	Number measured	Common name	Scientific name	Number measured
Surfperch, barred	<i>Amphistichus argenteus</i>	7	Rockfish, kelp	<i>Sebastes atrovirens</i>	1060
Surfperch, large	<i>Anisotremus davidsonii</i>	4	Rockfish, brown	<i>S. auriculatus</i>	120
Surfperch, blacksmelt	<i>Anoplopoma fimbria</i>	37	Rockfish, silvergray	<i>S. brevispinis</i>	3
Seabass, white	<i>Atherinopsis californiensis</i>	4	Rockfish, gopher	<i>S. carnatus</i>	147
Triggrerfish, finescale	<i>Atractoscion nobilis</i>	23	Rockfish, copper	<i>S. caurinus</i>	274
Whitefish, ocean	<i>Balistes polylepis</i>	1	Rockfish, greenspotted	<i>S. chlorostictus</i>	224
Shark, swell	<i>Caulolatilus princeps</i>	218	Rockfish, black & yellow	<i>S. chrysomelas</i>	28
Shark, black	<i>Cephaloscyllium ventriosum</i>	5	Rockfish, starry	<i>S. constellatus</i>	120
Shark, blacksmith	<i>Cheilotrema saturnum</i>	5	Rockfish, calico	<i>S. dallii</i>	31
Shanddab, Pacific	<i>Chromis punctipinnis</i>	12	Rockfish, splitnose	<i>S. diploproa</i>	4
Shanddab, speckled	<i>Citharichthys sordidus</i>	48	Rockfish, greenstriped	<i>S. elongatus</i>	80
Surfperch, shiner	<i>C. stigmaeus</i>	2	Rockfish, swordspine	<i>S. ensifer</i>	13
Shole, petrale	<i>Cymatogaster aggregata</i>	2	Rockfish, widow	<i>S. entomelas</i>	78
Shark, soupfin	<i>Eopsetta jordani</i>	17	Rockfish, pink	<i>S. eos</i>	50
Shark, white	<i>Galeorhinus zyopterus</i>	2	Rockfish, yellowtail	<i>S. flavidus</i>	11
Shaleye	<i>Genyonemus lineatus</i>	1759	Rockfish, bronzespotted	<i>S. gilli</i>	14
Shasse, rock	<i>Girella nigricans</i>	50	Chilipepper	<i>S. goodiei</i>	1409
Shark, horn	<i>Halichoeres semicinctus</i>	2	Rockfish, rosethorn	<i>S. helvomaculatus</i>	7
Shelpfish, giant	<i>Heterodontus francisci</i>	1	Rockfish, squarespot	<i>S. hopkinsi</i>	477
Shreeiling, kelp	<i>Heterostichus rostratus</i>	26	Cowcod	<i>S. levis</i>	84
Shole, flathead	<i>Hexagrammus decagrammus</i>	1	Rockfish, Mexican	<i>S. macdonaldi</i>	14
Shole, bigmouth	<i>Hypoglossina elassodon</i>	2	Rockfish, vermilion	<i>S. miniatus</i>	361
Shatfish	<i>H. stomata</i>	1	Rockfish, blue	<i>S. mystinus</i>	761
Shurfperch, walleye	<i>Hydrolagus colliei</i>	3	Rockfish, speckled	<i>S. ovalis</i>	34
Shurfperch, silver	<i>Hyperprosopon argenteum</i>	1	Bocaccio	<i>S. paucispinis</i>	4539
Shurfperch, rainbow	<i>H. ellipticum</i>	2	Rockfish, chameleon	<i>S. phillipsi</i>	15
Shark, bonito	<i>Hypsurus caryi</i>	2	Rockfish, canary	<i>S. pinniger</i>	21
Shole, rock	<i>Isurus oxyrinchus</i>	1	Rockfish, grass	<i>S. rastrelliger</i>	99
Shalfmoon	<i>Lepidopsetta bilineata</i>	2	Rockfish, rosy	<i>S. rosaceus</i>	109
Shake, Pacific	<i>Medialuna californiensis</i>	762	Rockfish, greenblotched	<i>S. rosenblatti</i>	68
Shoothhound, grey	<i>Merluccius productus</i>	6	Rockfish, yelloweye	<i>S. ruberrimus</i>	1
Shoothhound, brown	<i>Mustelus californicus</i>	1	Rockfish, flag	<i>S. rubrivinctus</i>	121
Shingcod	<i>M. henlei</i>	4	Rockfish, bank	<i>S. rufus</i>	383
Shenorita	<i>Ophiodon elongatus</i>	51	Rockfish, stripetail	<i>S. saxicola</i>	1
Shass, kelp	<i>Oxyjulis californica</i>	4	Rockfish, halfbanded	<i>S. semicinctus</i>	5
Shass, spotted sand	<i>Paralabrax clathratus</i>	6206	Rockfish, olive	<i>S. serranoides</i>	725
Shass, barred sand	<i>P. maculatofasciatus</i>	63	Treefish	<i>S. serriiceps</i>	98
Shalibut, California	<i>P. nebulifer</i>	929	Rockfish, honeycomb	<i>S. umbrosus</i>	81
Shole, English	<i>Paralichthys californicus</i>	210	Yellowtail	<i>Seriola dorsalis</i>	107
Shleephead, California	<i>Parophrys vetulus</i>	1	Queenfish	<i>Seriphus politus</i>	40
Shhornback	<i>Pimelometopon pulchrum</i>	232	Barracuda, California	<i>Sphyræna argentea</i>	1321
Shark, blue	<i>Platyrrhinoïdis triseriata</i>	4	Dogfish, spiny	<i>Squalus acanthias</i>	9
Shurfperch, rubberlip	<i>Prionace glauca</i>	2	Shark, Pacific angle	<i>Squatina californica</i>	1
Shuitarfish, shovelnose	<i>Rhacochilus toxotes</i>	2	Lizardfish, California	<i>Synodus lucioceps</i>	100
Shonito, Pacific	<i>Rhinobatos productus</i>	4	Mackerel, jack	<i>Trachurus symmetricus</i>	41
Shackerel, Pacific	<i>Sarda chilensis</i>	729	Croaker, yellowfin	<i>Umbrina roncador</i>	6
Shulpin	<i>Scomber japonicus</i>	3841	Stingray, round	<i>Urolophus halleri</i>	1
Shabezon	<i>Scorpaena guttata</i>	735	Sole, fantail	<i>Xystreurus liolepis</i>	1
	<i>Scorpaenichthys marmoratus</i>	51	TOTAL		29,374



TABLE 2. Number of Fishes Measured from Long-Range Partyboats, April Through June 1978.

Common name	Scientific name	Number measured
Wahoo	<i>Acanthocybium solanderi</i>	273
Jack, black	<i>Caranx lugubris</i>	7
Dolphinfish, paloma	<i>Coryphaena equiselis</i>	1
Dolphinfish, common	<i>C. hippurus</i>	1
Runner, rainbow	<i>Elagatis bipinnulata</i>	2
Cabrilla, spotted	<i>Epinephelus analogus</i>	7
Bass, leather	<i>E. dermatolepis</i>	24
Grouper, snowy	<i>E. niveatus</i>	70
Cabrilla, flag	<i>E. labriformis</i>	2
Skipjack, black	<i>Euthynnus lineatus</i>	2
Skipjack	<i>E. pelamis</i>	9
Grouper, spotted broomtail	<i>Mycteroperca prionura</i>	3
Grouper, gulf	<i>M. jordani</i>	1
Lechuza, bank	<i>Pontinus vaughani</i>	1
Sierra	<i>Scomberomorus sierra</i>	2
Amberjack, Pacific	<i>Seriola colburni</i>	9
Yellowtail	<i>S. dorsalis</i>	341
Barracuda, California	<i>Sphyræna argentea</i>	12
Sea bass, giant	<i>Stereolepis gigas</i>	9
Tuna, yellowfin	<i>Thunnus albacares</i>	410
Tuna, bluefin	<i>T. thynnus</i>	4
	TOTAL	1,190

TABLE 3. Species Composition of Rockfishes (*Sebastes* spp.) Catch from Partyboat Samples, April through June 1978.

Common name	Scientific name	Frequency of occurrence (%)
Bocaccio	<i>Sebastes paucispinis</i>	38.9
Chilipepper	<i>S. goodei</i>	12.1
Kelp	<i>S. atrovirens</i>	9.1
Blue	<i>S. mystinus</i>	6.5
Olive	<i>S. serranoides</i>	6.2
Squarespot	<i>S. hopkinsi</i>	4.1
Bank	<i>S. rufus</i>	3.3
Vermilion	<i>S. miniatus</i>	3.1
Copper	<i>S. caurinus</i>	2.3
Greenspotted	<i>S. chlorostictus</i>	1.9
Gopher	<i>S. carnatus</i>	1.3
Flag	<i>S. rubrivinctus</i>	1.0
Brown	<i>S. auriculatus</i>	1.0
Starry	<i>S. constellatus</i>	1.0
Rosy	<i>S. rosaceus</i>	0.9
Grass	<i>S. rastrelliger</i>	0.8
Treefish	<i>S. serriceps</i>	0.8
Cowcod	<i>S. levis</i>	0.7
Honeycomb	<i>S. umbrosus</i>	0.7
Greenstriped	<i>S. elongatus</i>	0.7
Widow	<i>S. entomelas</i>	0.7
Greenblotched	<i>S. rosenblatti</i>	0.6
Pink	<i>S. eos</i>	0.4
Speckled	<i>S. ovalis</i>	0.3
Calico	<i>S. dallii</i>	0.3
Black & Yellow	<i>S. chrysomelas</i>	0.2
Canary	<i>S. pinniger</i>	0.2
Chameleon	<i>S. phillipsi</i>	0.1
Bronzespotted	<i>S. gilli</i>	0.1
Mexican	<i>S. macdonaldi</i>	0.1
Swordspine	<i>S. ensifer</i>	0.1
Yellowtail	<i>S. flavidus</i>	0.1
Rosethorn	<i>S. helvomaculatus</i>	0.1
Halfbanded	<i>S. semicinctus</i>	<0.1
Splitnose	<i>S. diploproa</i>	<0.1
Silvergray	<i>S. brevispinis</i>	<0.1
Yelloweye	<i>S. ruberrimus</i>	<0.1
Stripetail	<i>S. saxicola</i>	<0.1

TABLE 4. Effort and Catch Per-Unit-Effort Values Determined from Partyboats Samples for Each Port Complex and Month, January Through June 1978.

	Port complex	Jan	Feb	Mar	Apr	May	Jun
No. trips/month							
	1	8	10	12	4	4	14
	2	5	5	6	2	6	10
	3	2	6	6	3	4	8
	4	6	10	6	9	9	9
	5	9	9	8	10	9	15
	6	11	10	12	11	9	12
	TOTAL	41	50	50	39	41	68
Avg. no. anglers/trip							
	1	22.87	20.50	22.25	16.50	32.75	26.79
	2	16.60	28.40	24.67	28.00	32.17	28.80
	3	23.00	20.50	28.83	13.33	25.00	34.25
	4	24.83	28.90	30.67	33.44	44.67	37.11
	5	25.78	30.44	30.50	22.70	29.22	22.60
	6	24.45	22.30	20.33	27.82	33.33	28.25
	Average	23.00	25.00	25.00	25.00	33.00	29.00
No. fish caught/angler hour fished							
	1	1.74	2.00	1.69	1.68	3.28	1.74
	2	2.74	2.53	0.79	2.64	1.48	1.44
	3	1.26	1.43	0.83	1.31	1.78	1.95
	4	2.56	2.68	2.23	1.70	1.18	1.64
	5	2.90	2.64	1.66	1.25	1.88	2.10
	6	1.78	2.00	2.66	2.55	2.33	1.15
	Average	2.20	2.25	1.76	1.85	1.79	1.63

TABLE 5. Effort and Catch per-Unit-Effort Values Determined from Partyboats for Each Port Complex and Month, January 1976 Through December 1977.

		1976												
		Port complex	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No. trips/month		1	7	8	8	10	10	11	0	4	12	8	14	11
		2	7	5	7	7	10	9	5	7	5	2	4	6
		3	3	2	2	2	3	4	3	2	2	4	6	4
		4	7	5	6	9	10	8	13	9	8	9	7	8
		5	11	16	12	11	9	8	12	13	6	7	14	12
		6	10	11	12	9	9	8	10	16	10	13	15	15
	TOTAL		45	47	47	48	51	48	43	51	43	43	60	56
Avg. no. anglers/trip		1	29.71	19.25	28.63	20.50	48.10	44.55	-	46.00	28.66	23.88	15.64	18.30
		2	26.57	23.00	20.57	21.57	30.20	36.89	51.20	45.71	29.60	21.50	18.50	19.70
		3	22.33	22.00	11.50	23.00	21.67	45.50	44.33	36.50	38.50	19.50	33.17	23.30
		4	30.57	29.00	26.17	25.33	26.20	39.38	43.23	49.11	30.75	27.20	25.28	27.50
		5	22.00	23.44	29.58	29.00	31.56	35.38	39.67	39.92	25.83	23.70	24.21	21.90
		6	16.40	25.64	23.83	22.89	26.22	27.13	43.30	38.44	24.00	21.46	18.00	19.60
	Average		24.91	23.32	23.38	24.06	31.96	37.90	43.26	42.22	28.14	23.30	21.30	21.50
No. fish caught/angler hour fished		1	1.20	1.36	1.20	0.95	1.28	2.07	-	0.40	0.70	1.14	2.45	2.21
		2	1.47	1.16	1.16	0.73	0.92	1.13	0.92	0.44	0.39	1.21	2.09	1.66
		3	1.25	0.50	2.16	1.47	0.67	0.70	0.43	0.55	0.55	0.89	1.61	1.00
		4	1.87	1.77	1.48	1.67	0.80	0.94	0.76	0.80	1.18	2.07	2.19	2.19
		5	3.28	2.77	2.51	1.97	1.47	0.74	0.69	1.05	1.09	1.00	1.66	2.54
		6	3.55	1.80	1.92	1.41	2.33	1.03	0.58	0.87	1.43	1.96	3.19	2.92
	Average		2.15	1.69	1.74	1.42	1.23	1.13	0.70	0.77	0.96	1.62	2.24	2.28
		1977												
		Port complex	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No. trips/month		1	1	3	7	10	8	10	12	9	8	9	8	5
		2	6	2	2	2	3	5	9	11	12	7	7	6
		3	4	3	2	2	3	5	5	5	4	5	4	3
		4	7	4	4	7	12	10	11	13	11	12	13	10
		5	10	5	8	7	8	6	9	12	16	13	16	9
		6	14	11	7	10	7	10	10	11	16	14	13	12
	TOTAL		42	28	30	38	41	46	56	61	67	60	61	45
Avg. no. anglers/trip		1	17.00	56.00	24.00	30.30	18.62	27.70	42.58	50.00	36.87	17.44	23.00	17.60
		2	18.33	32.50	23.00	24.00	19.67	30.40	40.78	40.55	22.00	27.29	21.57	28.67
		3	25.75	27.67	22.00	15.00	27.33	35.20	36.20	32.80	23.50	21.60	32.50	20.00
		4	28.57	32.50	24.00	33.00	31.17	42.80	41.27	29.54	28.27	23.58	35.08	27.90
		5	21.60	36.00	22.87	33.29	17.50	20.50	28.00	24.50	22.75	21.08	18.94	18.00
		6	19.00	30.45	26.14	25.50	23.14	12.30	31.20	41.82	22.75	14.40	18.62	13.50
	Average		21.00	34.00	22.00	28.00	23.00	32.00	37.00	36.00	26.00	20.00	24.00	22.00
No. fish caught/angler hour fished		1	1.85	1.35	0.89	0.98	1.29	0.98	1.10	0.98	1.30	1.61	2.41	2.82
		2	1.11	0.48	1.77	0.22	0.96	2.18	0.87	1.02	1.13	0.89	1.48	1.45
		3	1.03	0.66	1.86	0.60	1.00	1.20	0.62	1.29	1.06	2.07	1.98	1.33
		4	2.95	2.30	1.19	1.55	1.70	1.60	1.11	1.50	1.58	2.22	1.48	2.77
		5	2.40	0.88	2.30	1.07	0.47	1.00	0.96	1.74	1.70	2.24	1.82	1.78
		6	4.04	1.54	1.11	1.64	1.05	0.59	1.29	1.40	2.36	2.50	2.34	2.05
	Average		2.61	1.29	1.44	1.21	1.21	1.25	1.04	1.30	1.63	1.98	1.83	2.13

LENGTH HISTOGRAM FOR BOCACCIO, (SEBASTES PAUCISPINIS)  
 DURING APRIL 1978. THE Y AXES = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 3.0

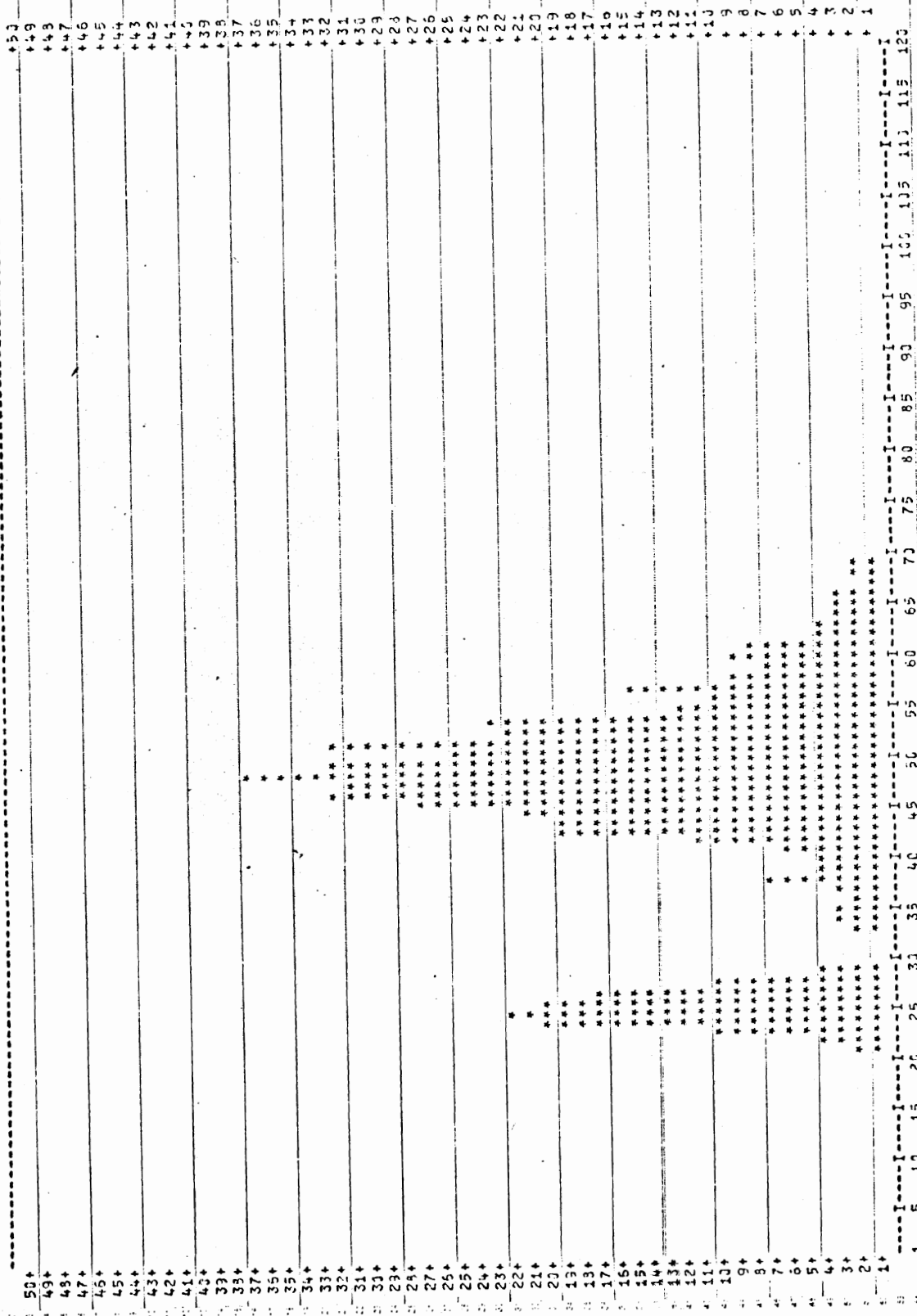


FIGURE 1. Length frequencies of bocaccio for April 1978.

LENGTH HISTOGRAM FOR BOCACCIO (SEBASTES PAUCISPINIS)  
 DURING MAY 1978.  
 THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 3.0

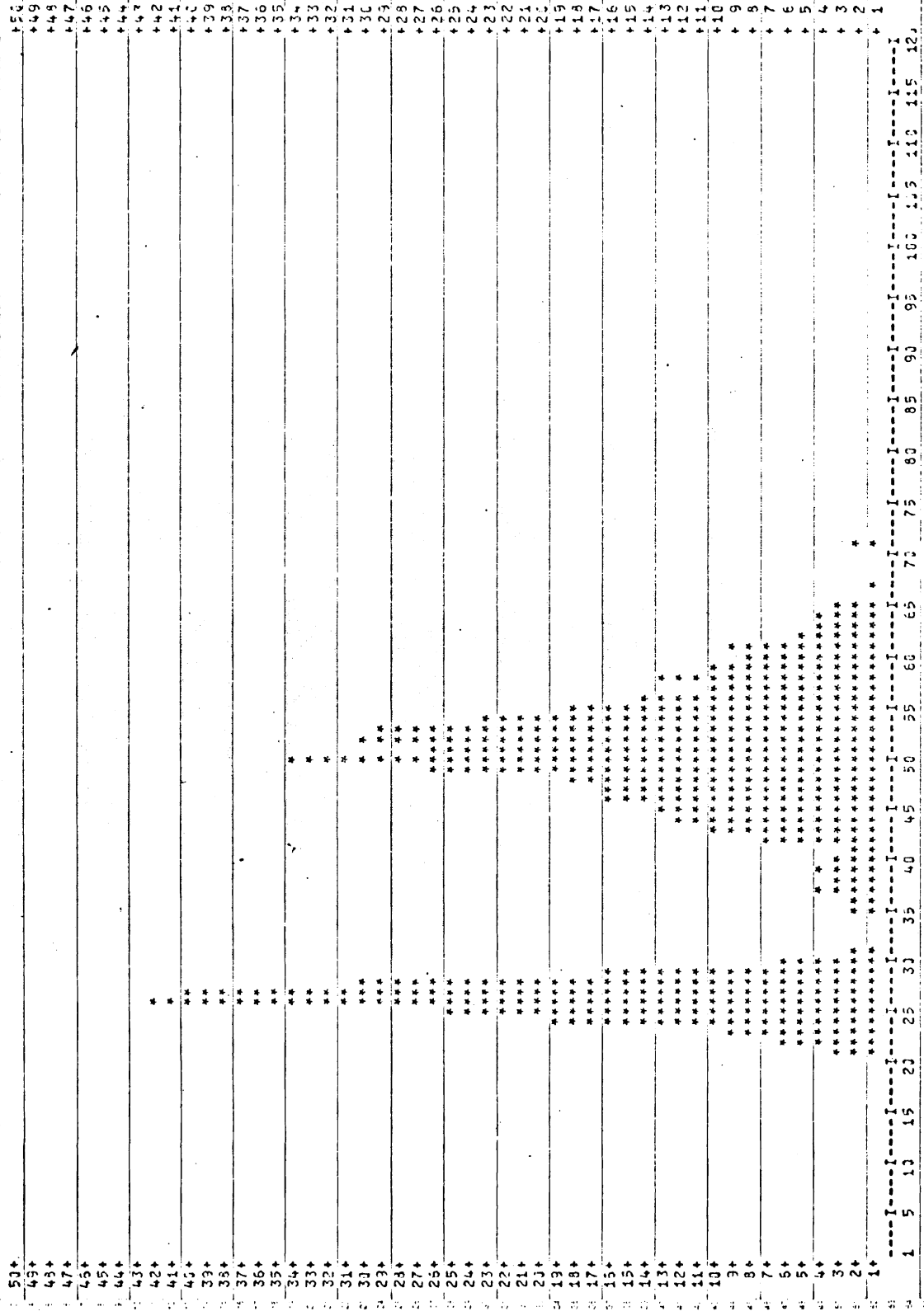


FIGURE 2. Length frequencies of bocaccio for May 1978.

LENGTH HISTOGRAM FOR BOCCACCIO (SEBASTES PAUCISPINIS)  
 DURING JUNE 1978. THE Y AXES = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 3.0

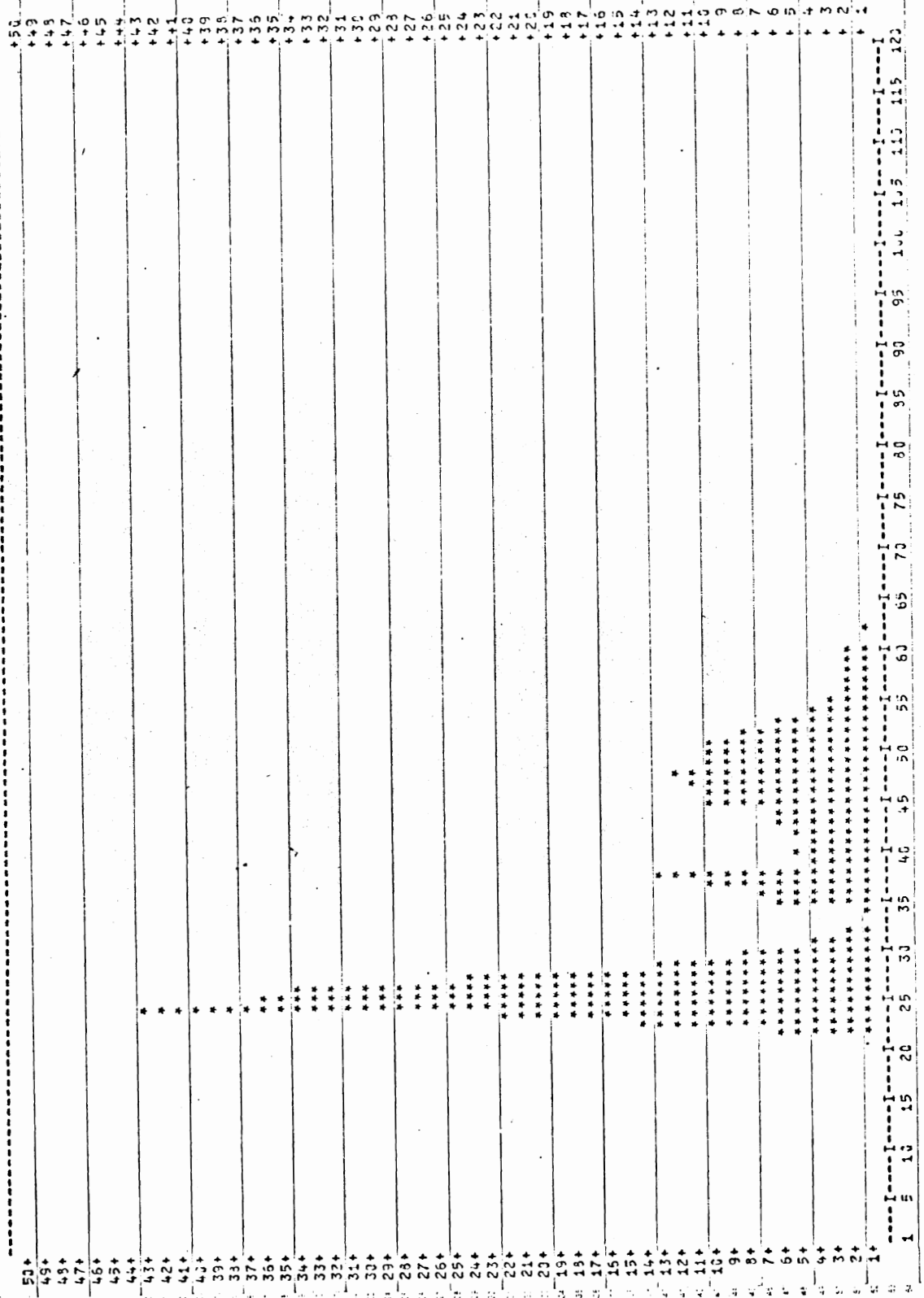


FIGURE 3. Length frequencies of bocaccio for June 1978.  
 Total No. Quarter 4,539    Mean Length Quarter 41.777 cm

LENGTH HISTOGRAM FOR CHILPEPPER (SEBASTES 5000II)  
 DURING APRIL 1978. THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1.0

Length (cm)	Frequency
50+	151
49+	149
48+	148
47+	147
46+	146
45+	145
44+	144
43+	143
42+	142
41+	141
40+	140
39+	139
38+	138
37+	137
36+	136
35+	135
34+	134
33+	133
32+	132
31+	131
30+	130
29+	129
28+	128
27+	127
26+	126
25+	125
24+	124
23+	123
22+	122
21+	121
20+	120
19+	119
18+	118
17+	117
16+	116
15+	115
14+	114
13+	113
12+	112
11+	111
10+	110
9+	109
8+	108
7+	107
6+	106
5+	105
4+	104
3+	103
2+	102
1+	101

TOTAL NO. = 532 THE X-AXIS = LENGTH (CENTIMETERS)  
 MEAN = 43.752 STANDARD DEVIATION = 7.939

FIGURE 4. Length frequencies of chilipepper for April 1978.



LENGTH HISTOGRAM FOR CHILPEPPER (SEBASTES 3003EI)  
DURING MAY 1978.

The Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 2.0

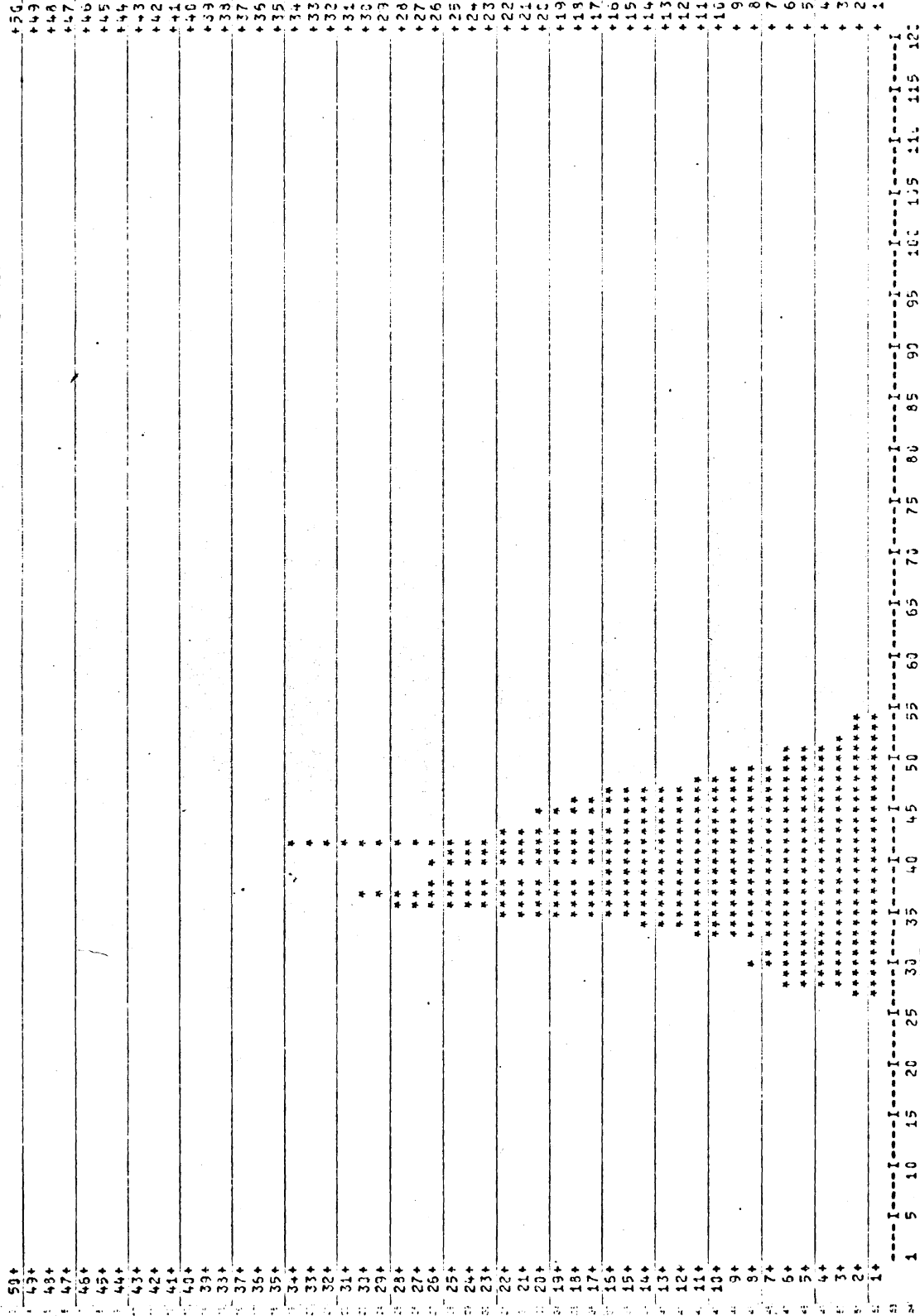
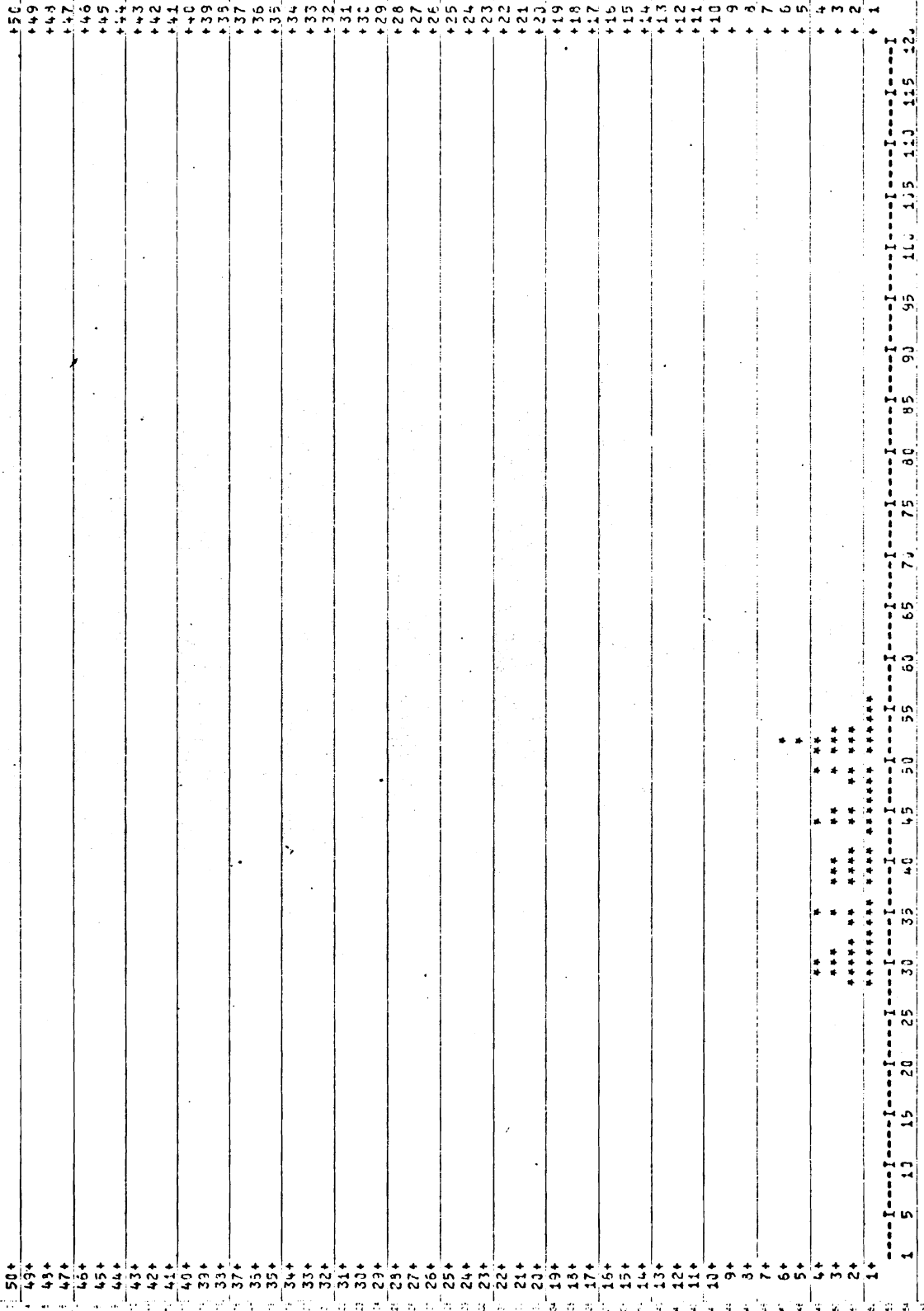


FIGURE 5. Length frequencies of chilipepper for May 1978.

LENGTH HISTOGRAM FOR CHILPEPPER (SEBASTES COODEI)  
 DURING JUNE 1978.  
 THE Y AXES = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1.0



TOTAL NO. = 63 THE X-AXIS = LENGTH (CENTIMETERS)  
 MEAN = 41.435 STANDARD DEVIATION = 9.539

FIGURE 6. Length frequencies of chilipepper for June 1978.  
 Total No. Quarter 1,409 Mean Length Quarter 40.354 cm

LENGTH HISTOGRAM FOR SEBASIES ATROVIRENS (KELP ROCKFISH)  
DURING APRIL 1978.

THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 4.0

50+	1	49+
49+	1	49
48+	1	49
47+	1	47
46+	1	46
45+	1	45
44+	1	44
43+	1	43
42+	1	42
41+	1	41
40+	1	40
39+	1	39
38+	1	39
37+	1	37
36+	1	36
35+	1	35
34+	1	34
33+	1	33
32+	1	32
31+	1	31
30+	1	30
29+	1	29
28+	1	28
27+	1	27
26+	1	26
25+	1	25
24+	1	24
23+	1	23
22+	1	22
21+	1	21
20+	1	20
19+	1	19
18+	1	18
17+	1	17
16+	1	16
15+	1	15
14+	1	14
13+	1	13
12+	1	12
11+	1	11
10+	1	10
9+	1	9
8+	1	8
7+	1	7
6+	1	6
5+	1	5
4+	1	4
3+	1	3
2+	1	2
1+	1	1

1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----

TOTAL NO. = 533      THE X-AXIS = LENGTH (CENTIMETERS)  
MEAN = 31.900      STANDARD DEVIATION = 1.629

FIGURE 7. Length frequencies of kelp rockfish for April 1978.

LENGTH HISTOGRAM FOR SEBASTES ATROVIRENS (KELP ROCKFISH)  
DURING MAY 1978.

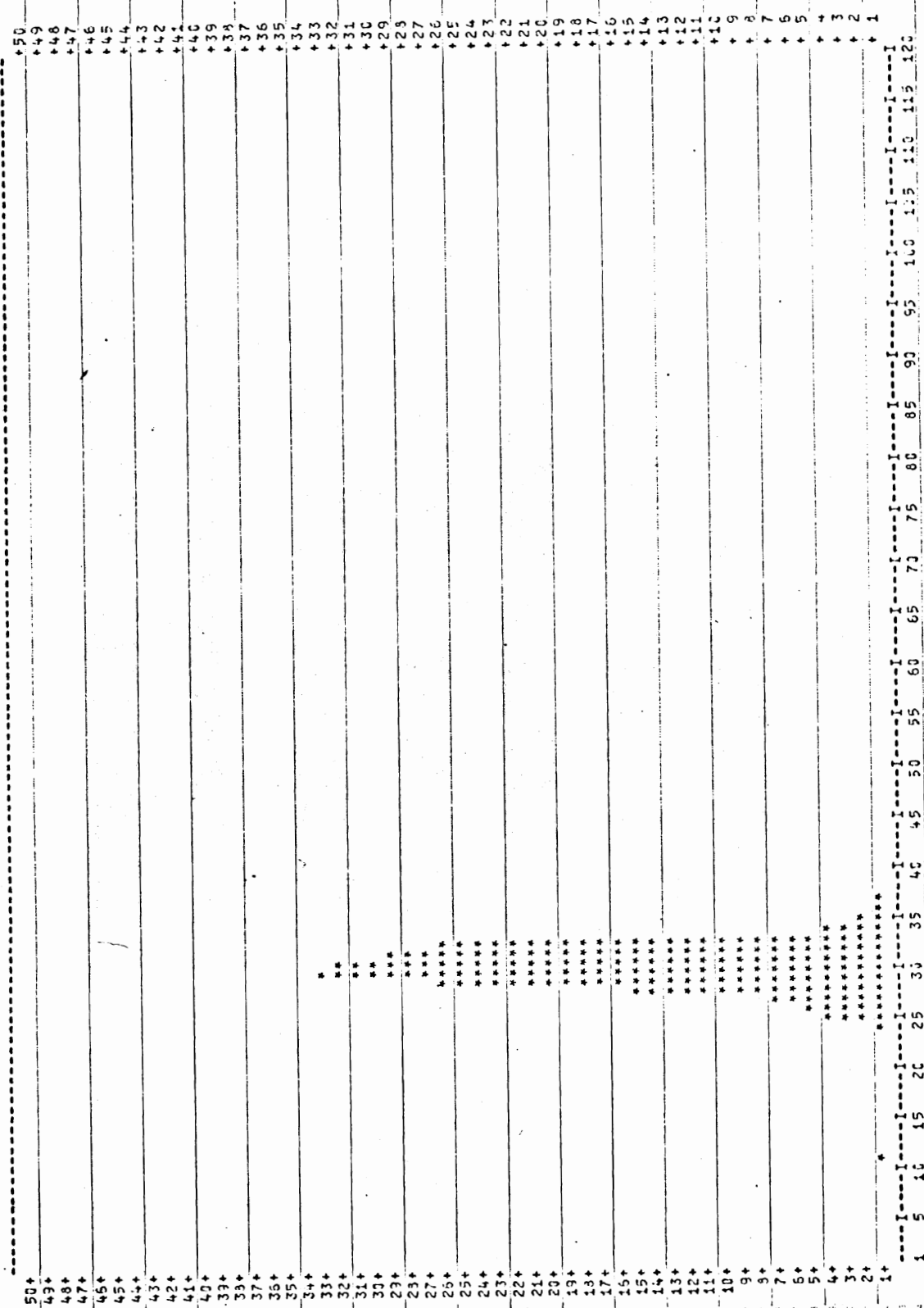
THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1.0

50+	43
49+	49
48+	48
47+	47
46+	45
45+	45
44+	44
43+	43
42+	42
41+	41
40+	41
39+	39
38+	38
37+	37
36+	35
35+	35
34+	34
33+	33
32+	32
31+	31
30+	30
29+	29
28+	28
27+	27
26+	26
25+	25
24+	24
23+	23
22+	22
21+	21
20+	20
19+	19
18+	18
17+	17
16+	16
15+	15
14+	14
13+	13
12+	12
11+	11
10+	10
9+	9
8+	9
7+	7
6+	6
5+	5
4+	4
3+	3
2+	2
1+	1
1	1
5	5
10	10
15	15
20	20
25	25
30	30
35	35
40	40
45	45
50	50
55	55
60	60
65	65
70	70
75	75
80	80
85	85
90	90
95	95
100	100
105	105
110	110
115	115
120	120

TOTAL NO. = 41      THE X-AXIS = LENGTH (CENTIMETERS)  
MEAN = 28.293      STANDARD DEVIATION = 4.495

FIGURE 8. Length frequencies of kelp rockfish for May 1978.

LENGTH HISTOGRAM FOR SEBASTES ATROVIRENS (KELP ROCKFISH)  
 DURING JUNE 1978.  
 THE Y AXES = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 2.0



TOTAL NO. = 366      THE X-AXIS = LENGTH (CENTIMETERS)  
 MEAN = 30.210      STANDARD DEVIATION = 3.108

FIGURE 9. Length frequencies of kelp rockfish for June 1978.  
 Total No. Quarter 1,060    Mean Length Quarter 31.112 cm

LENGTH HISTOGRAM FOR BLUE ROCKFISH (SEBASTES MYSTINUS)  
 DURING APRIL 1978.  
 THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1.0

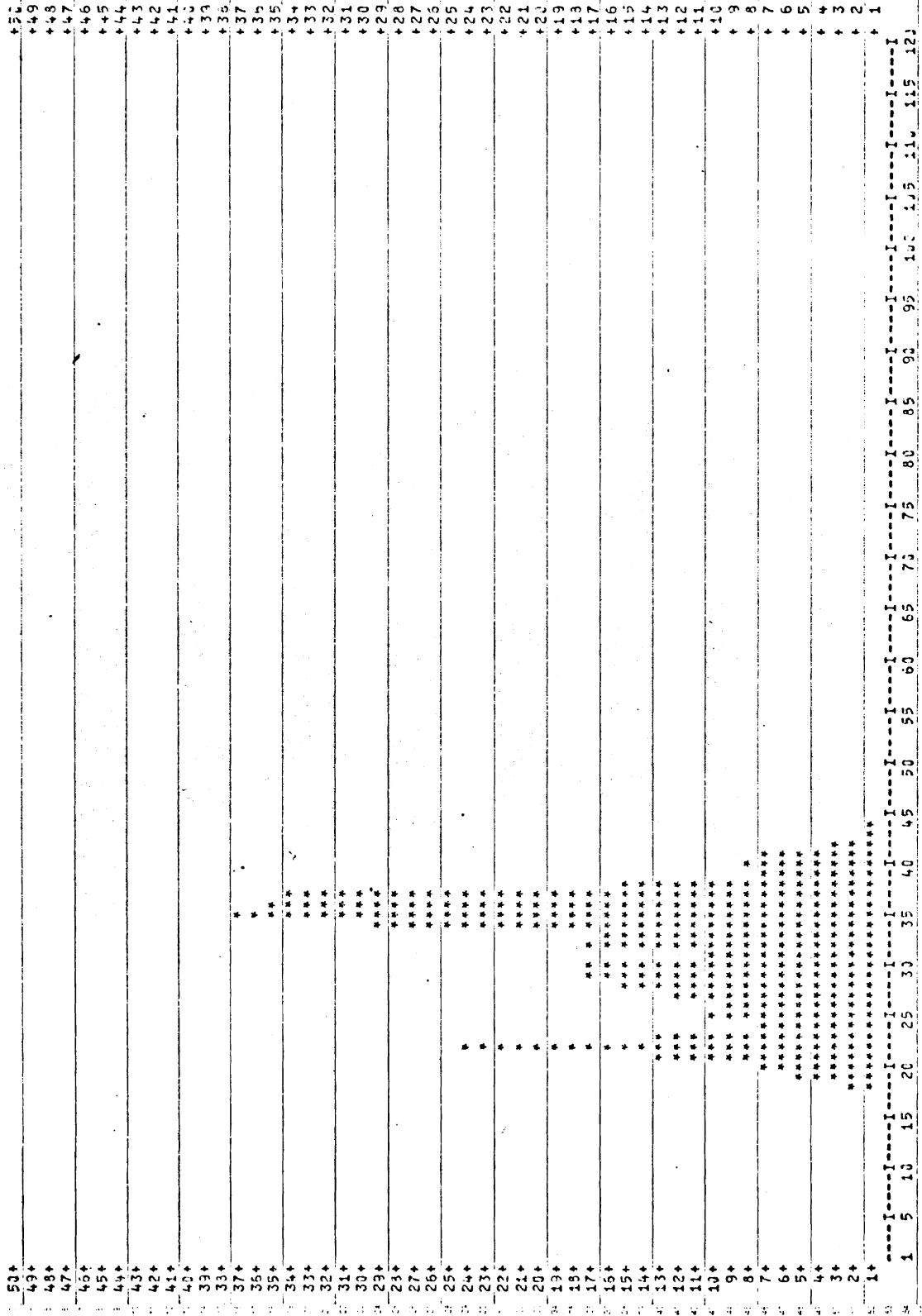
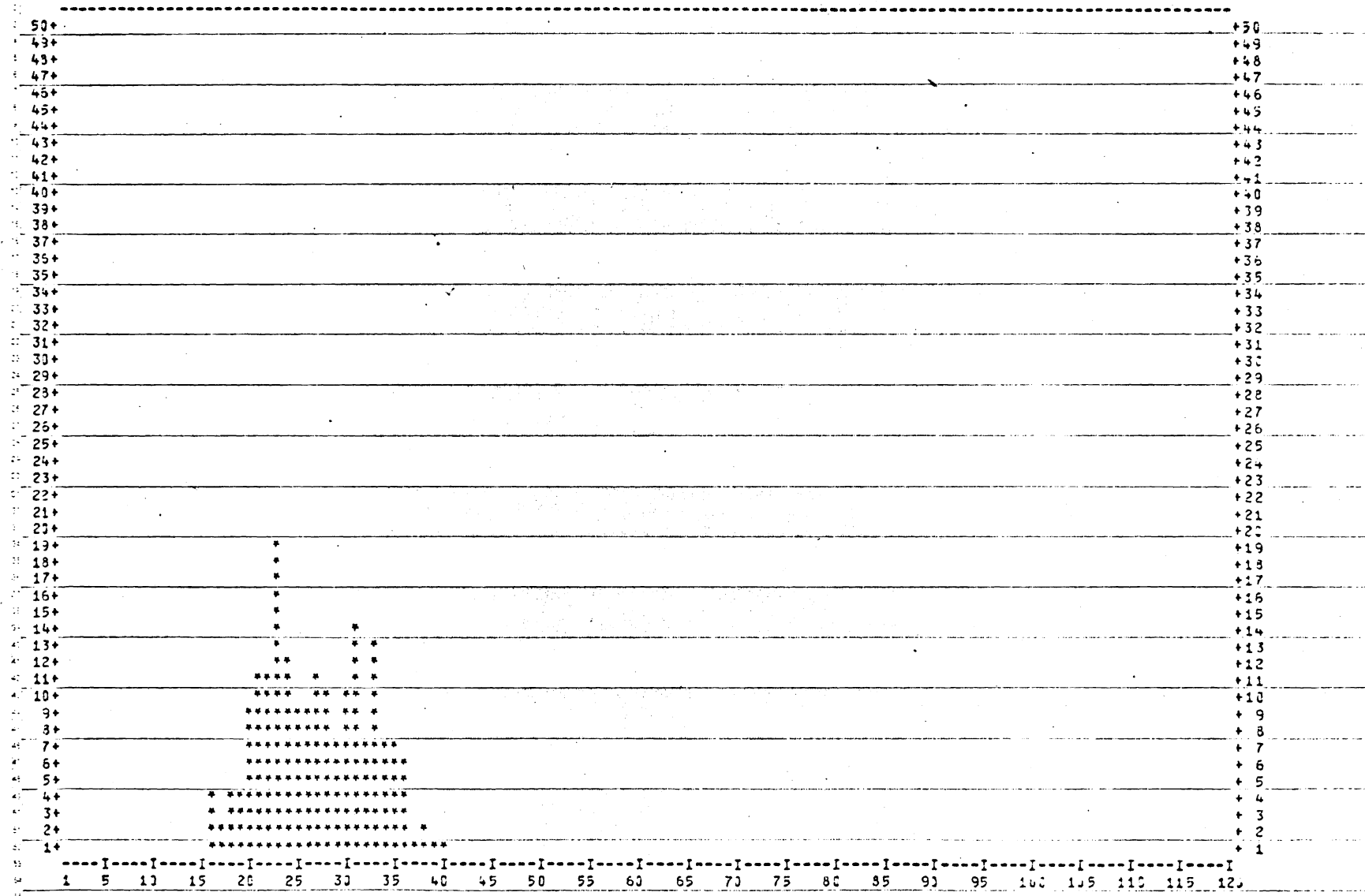


FIGURE 10. Length frequencies of blue rockfish for April 1978.

LENGTH HISTOGRAM FOR BLUE ROCKFISH (SEBASTES MYSTINUS)  
DURING MAY 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1.0

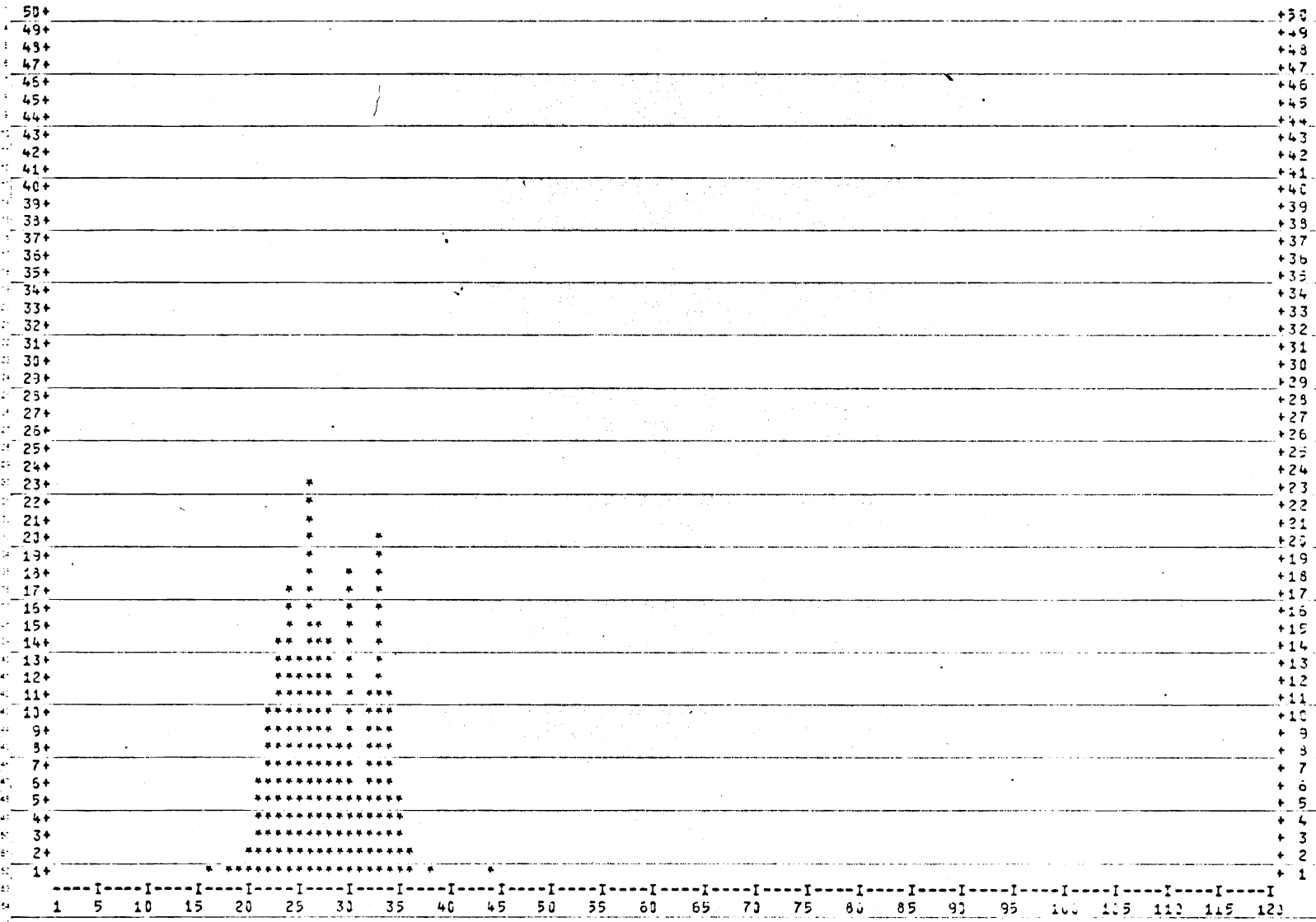


THE X-AXIS = LENGTH (CENTIMETERS)  
TOTAL NO. = 191 MEAN = 25.916 STANDARD DEVIATION = 5.491

FIGURE 11. Length frequencies of blue rockfish for May 1978.

LENGTH HISTOGRAM FOR BLUE ROCKFISH (SEBASTES MYSTINUS)  
 DURING JUNE 1978.

THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1.0



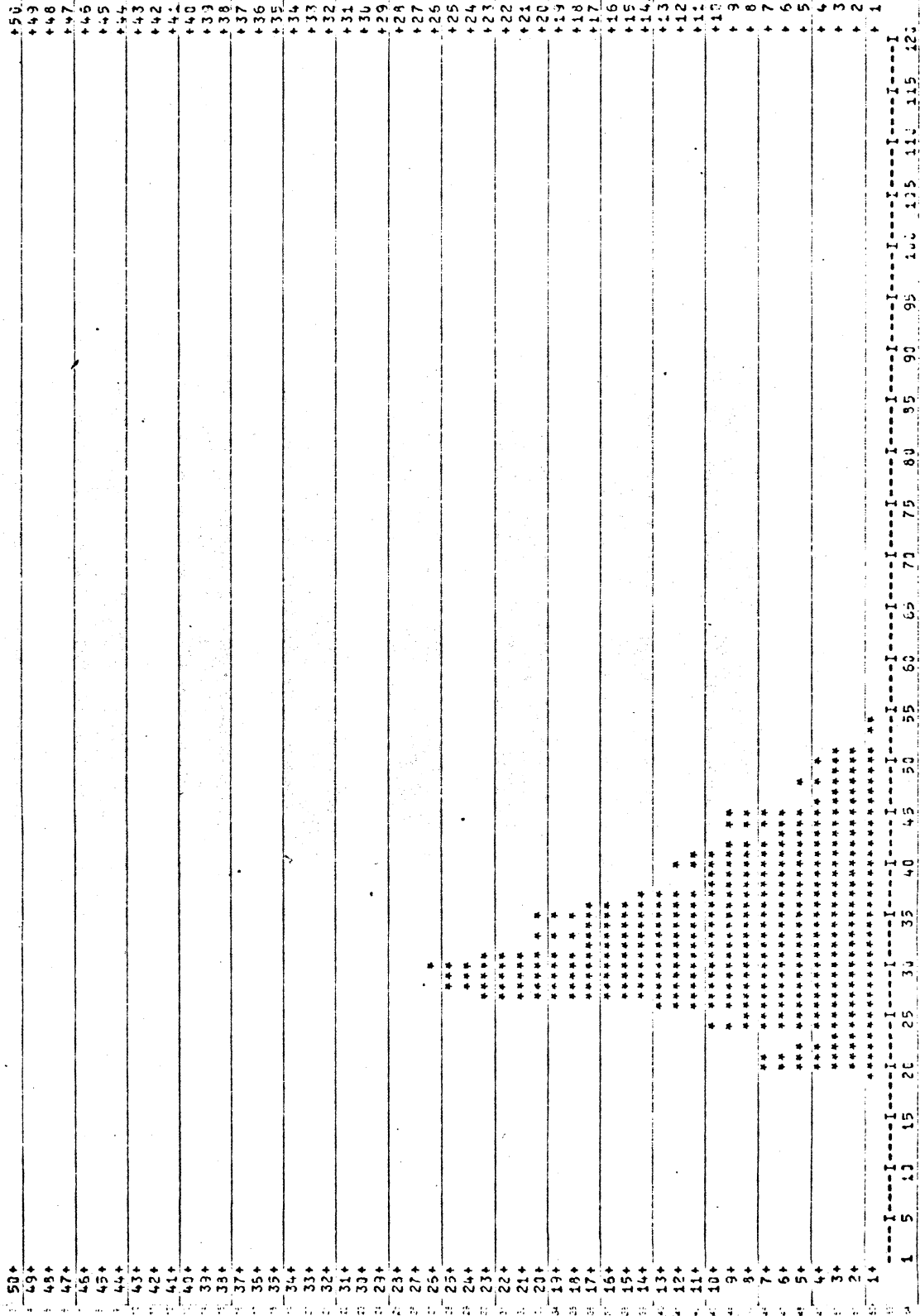
THE X-AXIS = LENGTH (CENTIMETERS)  
 TOTAL NO. = 199    MEAN = 27.794    STANDARD DEVIATION = 4.410

FIGURE 12. Length frequencies of blue rockfish for June 1978.  
 Total No. Quarter 761    Mean Length Quarter 29.285 cm



LENGTH HISTOGRAM FOR KELP BASS (PARALABRAX CLATHRATUS)  
DURING APRIL 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 2.0



TOTAL NO. = 782 THE X-AXIS = LENGTH (CENTIMETERS)  
MEAN = 33.505 STANDARD DEVIATION = 7.351

FIGURE 13. Length frequencies of kelp bass for April 1978.

LENGTH HISTOGRAM FOR KELP BASS (PARALABRAX CLATHRATUS)  
DURING MAY 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 4.0

50+	-----	5
49+	-----	4
48+	-----	3
47+	-----	2
46+	-----	1
45+	-----	0
44+	-----	0
43+	-----	0
42+	-----	0
41+	-----	0
40+	-----	0
39+	-----	0
38+	-----	0
37+	-----	0
36+	-----	0
35+	-----	0
34+	-----	0
33+	-----	0
32+	-----	0
31+	-----	0
30+	-----	0
29+	-----	0
28+	-----	0
27+	-----	0
26+	-----	0
25+	-----	0
24+	-----	0
23+	-----	0
22+	-----	0
21+	-----	0
20+	-----	0
19+	-----	0
18+	-----	0
17+	-----	0
16+	-----	0
15+	-----	0
14+	-----	0
13+	-----	0
12+	-----	0
11+	-----	0
10+	-----	0
9+	-----	0
8+	-----	0
7+	-----	0
6+	-----	0
5+	-----	0
4+	-----	0
3+	-----	0
2+	-----	0
1+	-----	0
0	-----	0

THE X-AXIS = LENGTH (CENTIMETERS)  
TOTAL NO. = 1592      MEAN = 32.024      STANDARD DEVIATION = 5.989

FIGURE 14. Length frequencies of kelp bass for May 1978.

LENGTH HISTOGRAM FOR KELP BASS (PARALABRAX CLATHRATUS)  
DURING JUNE 1978.  
THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 7.0

Length (cm)	Frequency
50+	49
49+	49
48+	48
47+	47
46+	46
45+	45
44+	44
43+	43
42+	42
41+	41
40+	40
39+	39
38+	38
37+	37
36+	36
35+	35
34+	34
33+	33
32+	32
31+	31
30+	30
29+	29
28+	28
27+	27
26+	26
25+	25
24+	24
23+	23
22+	22
21+	21
20+	20
19+	19
18+	18
17+	17
16+	16
15+	15
14+	14
13+	13
12+	12
11+	11
10+	11
9+	11
8+	9
7+	8
6+	7
5+	6
4+	5
3+	4
2+	3
1+	2

TOTAL NO. = 3732      THE X-AXIS = LENGTH (CENTIMETERS)  
MEAN = 32.523      STANDARD DEVIATION = 7.150

FIGURE 15. Length frequencies of kelp bass for June 1978.  
Total No. Quarter 6,206      Mean Length Quarter 32.510 cm

LENGTH HISTOGRAM FOR PACIFIC MACKEREL (SCOMBER JAPONICUS)  
DURING APRIL 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1.0

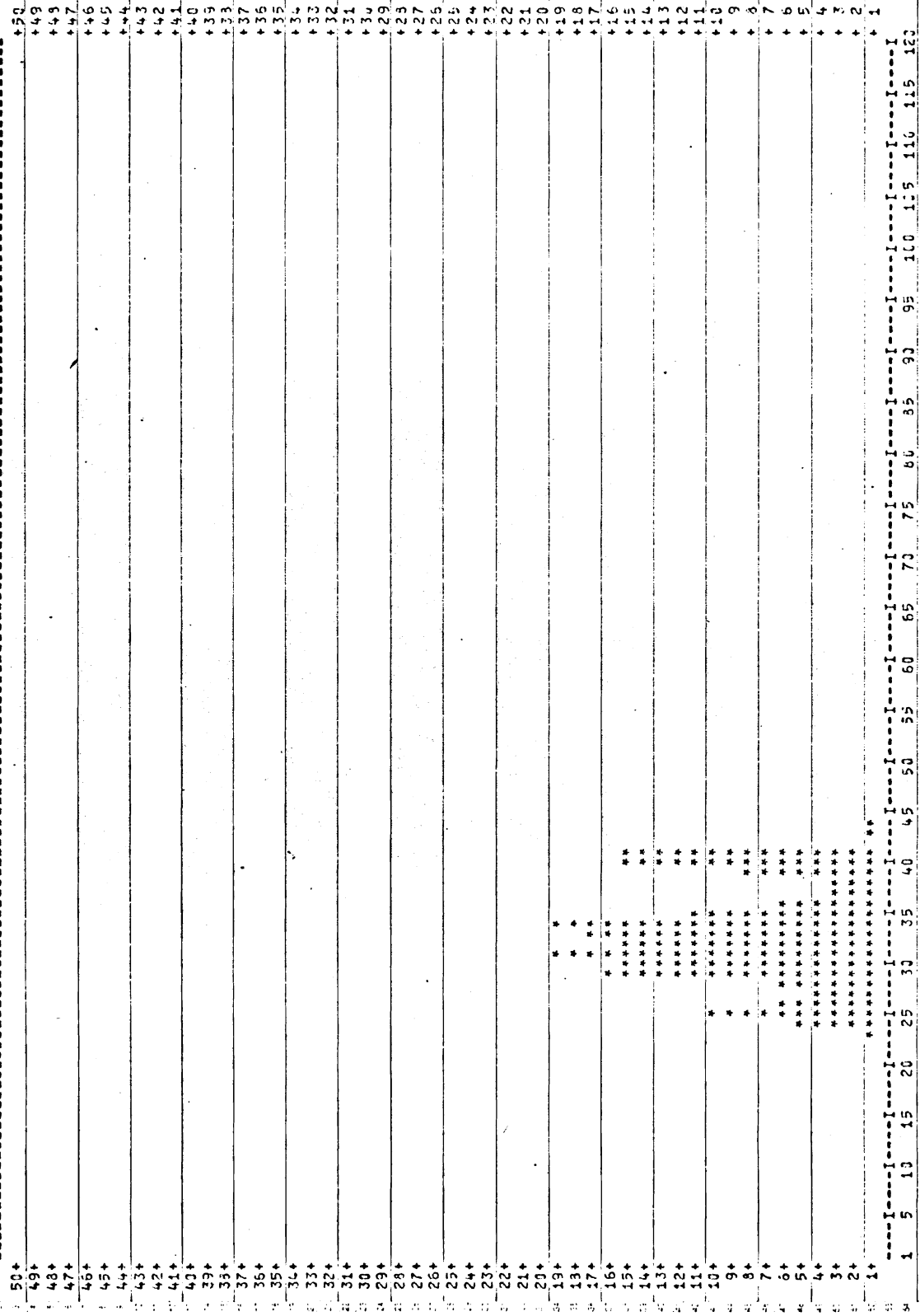


FIGURE 16. Length frequencies of Pacific mackerel for April 1978.



LENGTH HISTOGRAM FOR PACIFIC MACKEREL (SCOMBER JAPONICUS)  
DURING JUNE 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 7.6

Length (cm)	Frequency
50+	49
49+	48
48+	47
45+	45
45+	44
44+	43
42+	42
41+	41
40+	39
38+	38
37+	37
36+	36
35+	35
34+	34
33+	33
32+	32
31+	31
30+	31
29+	29
28+	29
27+	27
25+	25
24+	24
23+	23
22+	22
21+	21
20+	21
19+	19
18+	18
17+	17
15+	16
15+	15
14+	14
13+	14
12+	12
11+	11
10+	10
9+	9
8+	8
7+	7
6+	6
5+	5
4+	4
3+	3
2+	2
1+	1

TOTAL NO. = 2513      THE X-AXIS = LENGTH (CENTIMETERS)  
MEAN = 34.674      STANDARD DEVIATION = 4.559

FIGURE 18. Length frequencies of Pacific mackerel for June 1978.  
Total No. Quarter 3,841    Mean Length Quarter 34,536

LENGTH HISTOGRAM FOR CALIFORNIA BARRACUDA (SPHYRAENA ARGENTEA)

DURING APRIL 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1.0

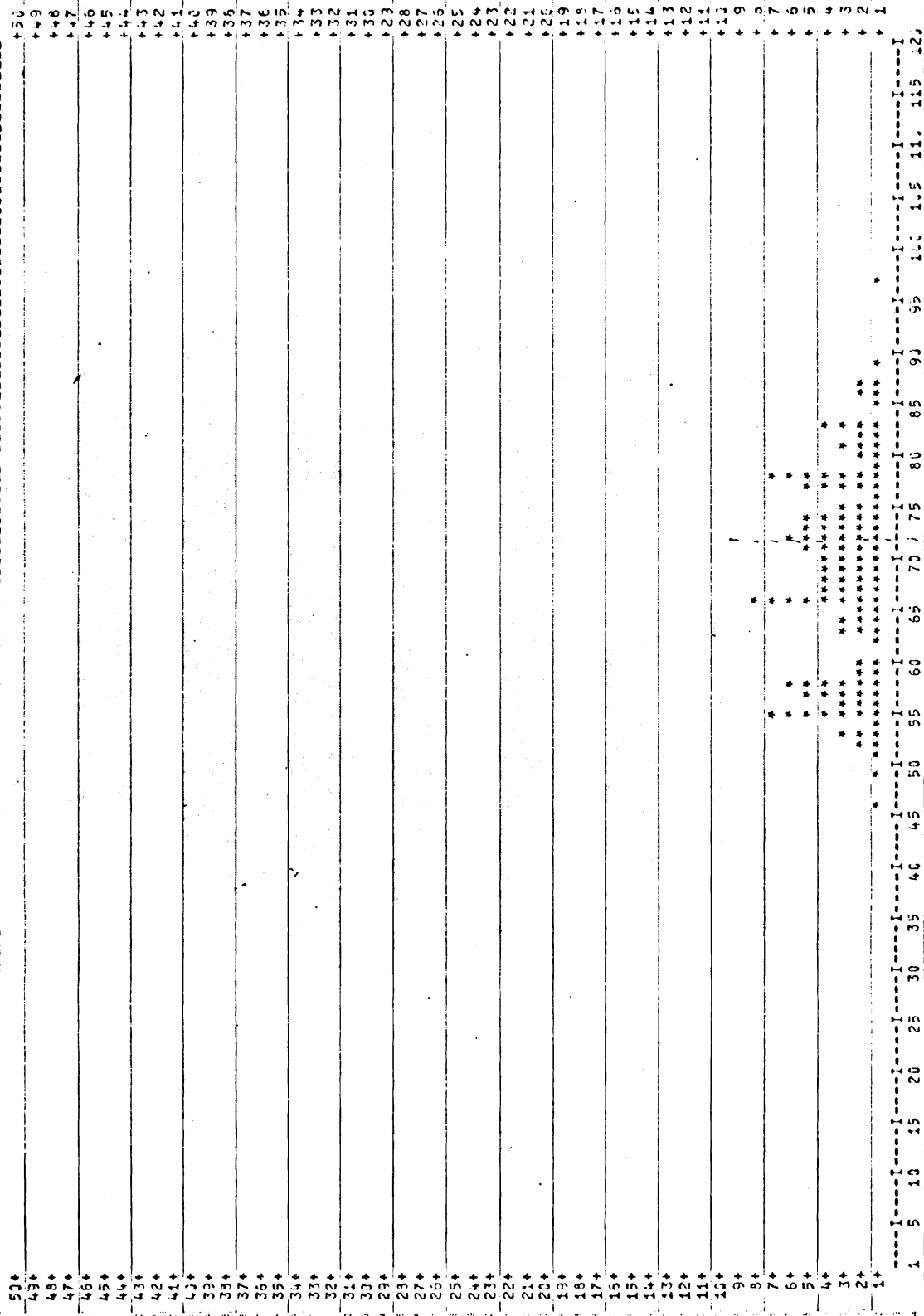


FIGURE 19. Length frequencies of California barracuda for April 1978.

LENGTH HISTOGRAM FOR CALIFORNIA BARRACUDA (SPHYRAENA ARGENTEA)  
 DURING MAY 1978.  
 THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 100

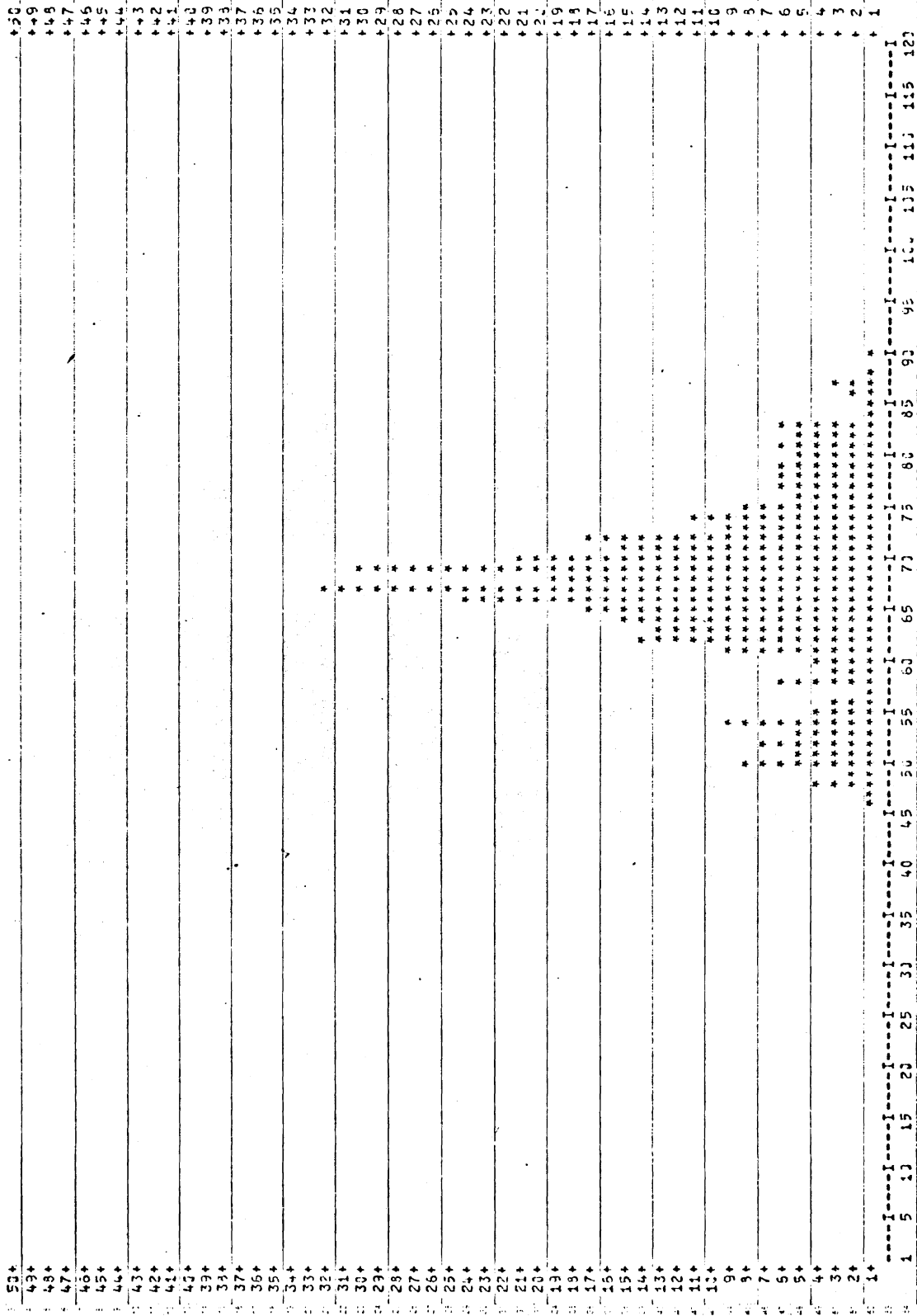


FIGURE 20. Length frequencies of California barracuda for May 1978.



LENGTH HISTOGRAM FOR CALIFORNIA BARRACUDA (SPHYRAENA ARGENTEA)  
DURING JUNE 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 2.0

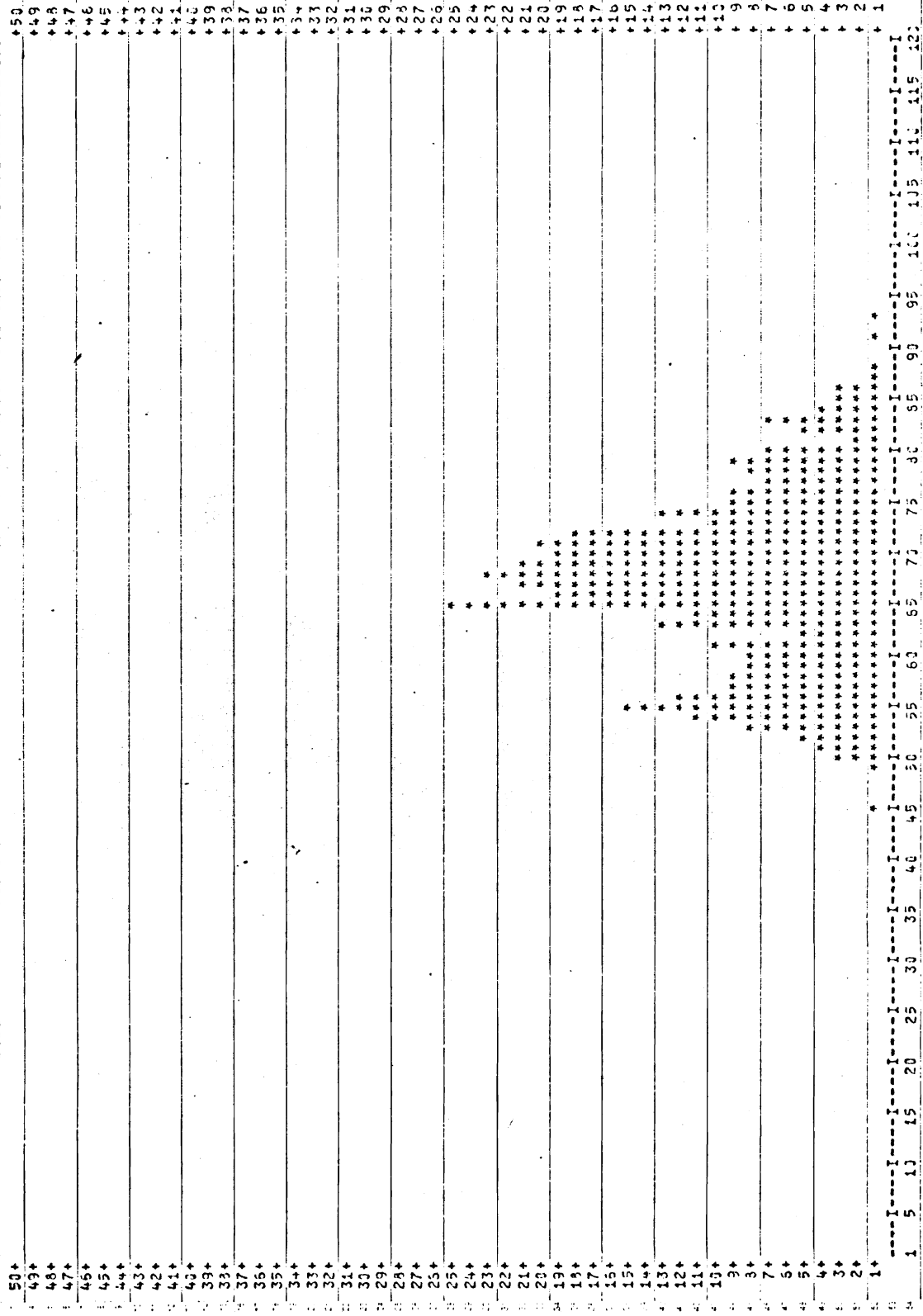


FIGURE 21. Length frequencies of California barracuda for June 1978.  
Total No. Quarter 1,321 Mean Length Quarter 67.639 cm

LENGTH HISTOGRAM FOR BARRED SAND BASS (PARALABRAX NEBULIFER)  
DURING APRIL 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1.0

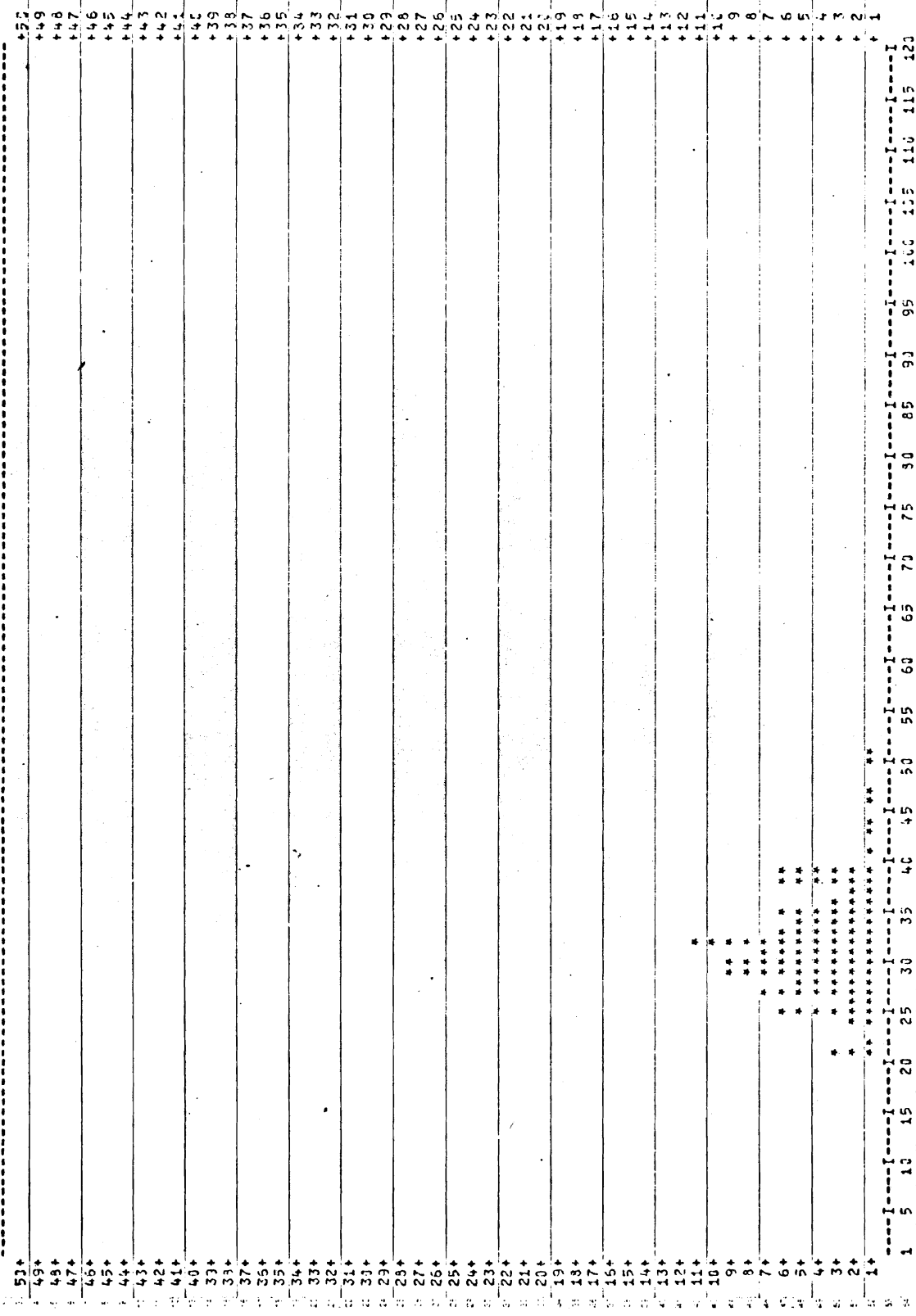
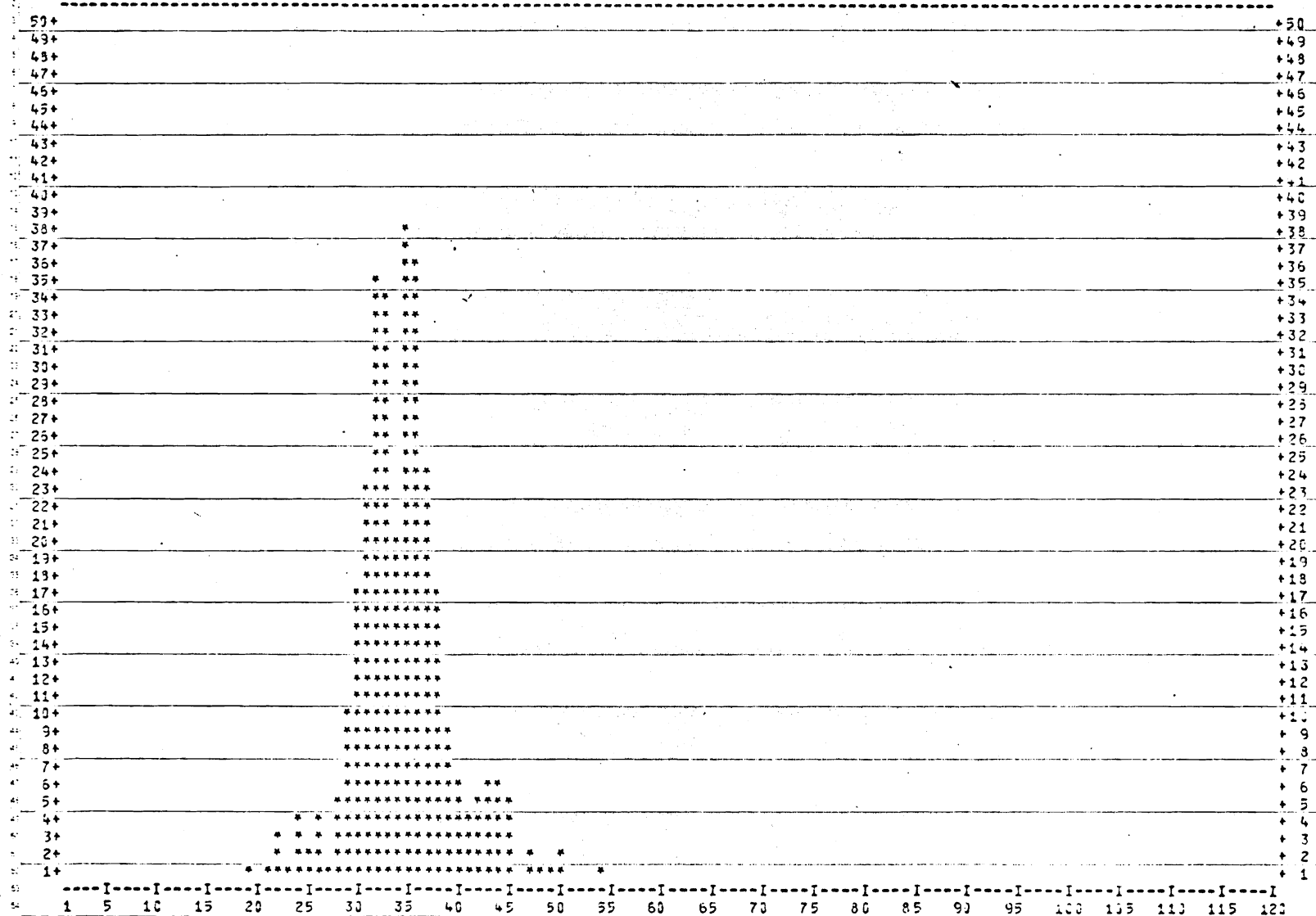


FIGURE 22. Length frequencies of barred sand bass for April 1978.

LENGTH HISTOGRAM FOR BARRED SAND BASS (PARALABRAX NEBULIFER)  
DURING MAY 1978.

THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1.0



THE X-AXIS = LENGTH (CENTIMETERS)  
TOTAL NO. = 324    MEAN = 34.562    STANDARD DEVIATION = 4.931

FIGURE 23. Length frequencies of barred sand bass for May 1978.

LENGTH HISTOGRAM FOR BARRED SAND BASS (PARALABRAX NEBULIFER)

DURING JUNE 1978.

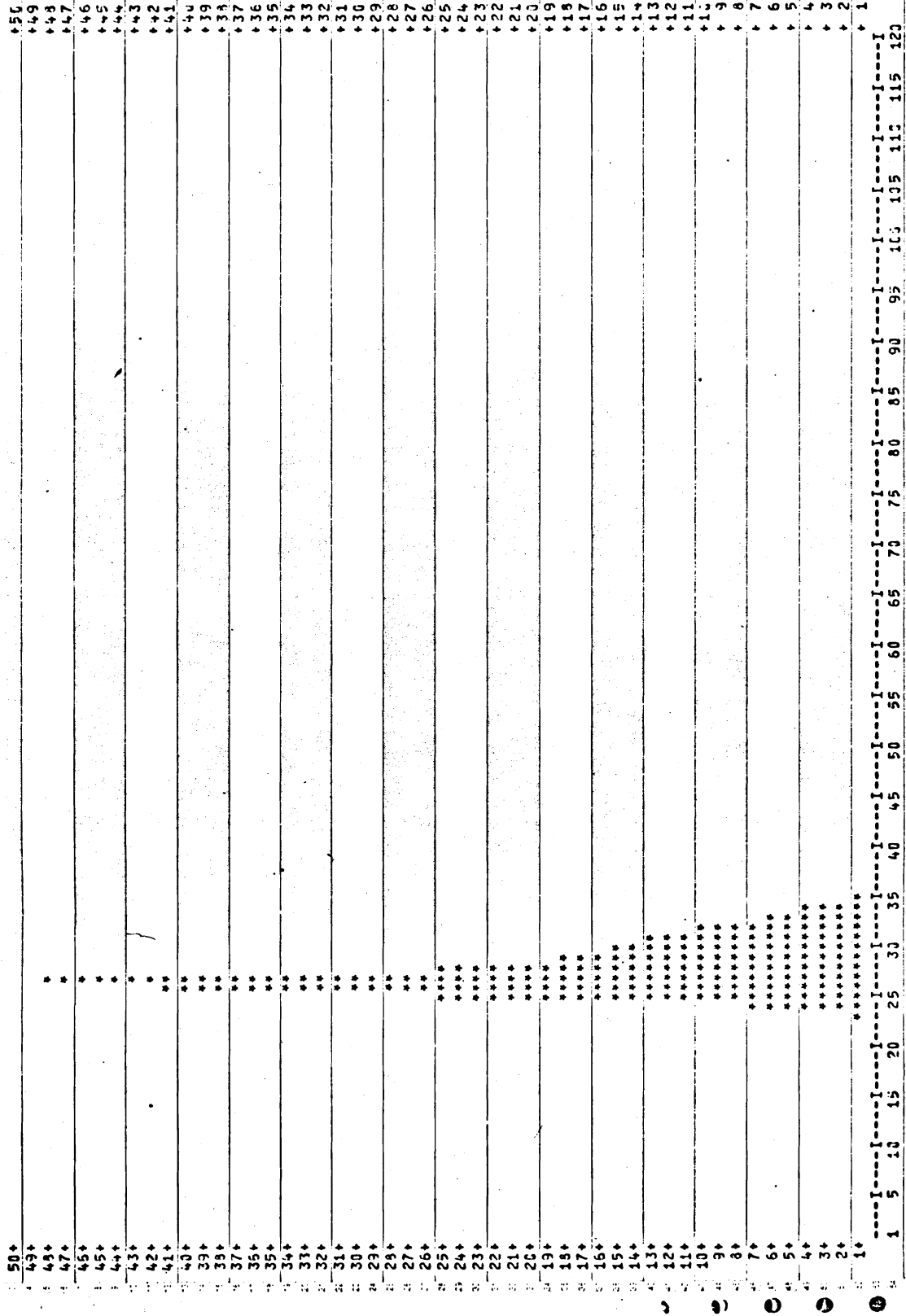
THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1.0

Length (cm)	Frequency	Length (cm)	Frequency
50+	1	10	1
49+	1	11	1
48+	1	12	1
47+	1	13	1
46+	1	14	1
45+	1	15	1
44+	1	16	1
43+	1	17	1
42+	1	18	1
41+	1	19	1
40+	1	20	1
39+	1	21	1
38+	1	22	1
37+	1	23	1
36+	1	24	1
35+	1	25	1
34+	1	26	1
33+	1	27	1
32+	1	28	1
31+	1	29	1
30+	1	30	1
29+	1	31	1
28+	1	32	1
27+	1	33	1
26+	1	34	1
25+	1	35	1
24+	1	36	1
23+	1	37	1
22+	1	38	1
21+	1	39	1
20+	1	40	1
19+	1	41	1
18+	1	42	1
17+	1	43	1
16+	1	44	1
15+	1	45	1
14+	1	46	1
13+	1	47	1
12+	1	48	1
11+	1	49	1
10+	1	50	1
9+	1	51	1
8+	1	52	1
7+	1		
6+	1		
5+	1		
4+	1		
3+	1		
2+	1		
1+	1		

TOTAL NO. = 532      THE X-AXIS = LENGTH (CENTIMETERS)  
MEAN = 35.843      STANDARD DEVIATION = 7.642

FIGURE 24. Length frequencies of barred sand bass for June 1978.  
Total No. Quarter 929    Mean Length Quarter 35.523 cm

LENGTH HISTOGRAM FOR HALFHCON (MEDIALUNA CALIFORNENSIS)  
DURING APRIL 1978.  
THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 2.0



TOTAL NO. = 447      THE X-AXIS = LENGTH (CENTIMETERS)  
MEAN = 27.816      STANDARD DEVIATION = 2.632

FIGURE 25. Length frequencies of halfmoon for April 1978.

LENGTH HISTOGRAM FOR HALFMCON (MEDIALUNA CALIFORNENSIS)  
 DURING MAY 1978.  
 THE Y AXIS = FREQUENCY (NUMBER OF FIS#)  
 MULTIPLICATION FACTOR = 1.0

Length (cm)	Frequency
150	150
149	149
148	148
147	147
146	146
145	145
144	144
143	143
142	142
141	141
140	140
139	139
138	138
137	137
136	136
135	135
134	134
133	133
132	132
131	131
130	130
129	129
128	128
127	127
126	126
125	125
124	124
123	123
122	122
121	121
120	120
119	119
118	118
117	117
116	116
115	115
114	114
113	113
112	112
111	111
110	110
109	109
108	108
107	107
106	106
105	105
104	104
103	103
102	102
101	101
100	100
99	99
98	98
97	97
96	96
95	95
94	94
93	93
92	92
91	91
90	90
89	89
88	88
87	87
86	86
85	85
84	84
83	83
82	82
81	81
80	80
79	79
78	78
77	77
76	76
75	75
74	74
73	73
72	72
71	71
70	70
69	69
68	68
67	67
66	66
65	65
64	64
63	63
62	62
61	61
60	60
59	59
58	58
57	57
56	56
55	55
54	54
53	53
52	52
51	51
50	50
49	49
48	48
47	47
46	46
45	45
44	44
43	43
42	42
41	41
40	40
39	39
38	38
37	37
36	36
35	35
34	34
33	33
32	32
31	31
30	30
29	29
28	28
27	27
26	26
25	25
24	24
23	23
22	22
21	21
20	20
19	19
18	18
17	17
16	16
15	15
14	14
13	13
12	12
11	11
10	10
9	9
8	8
7	7
6	6
5	5
4	4
3	3
2	2
1	1

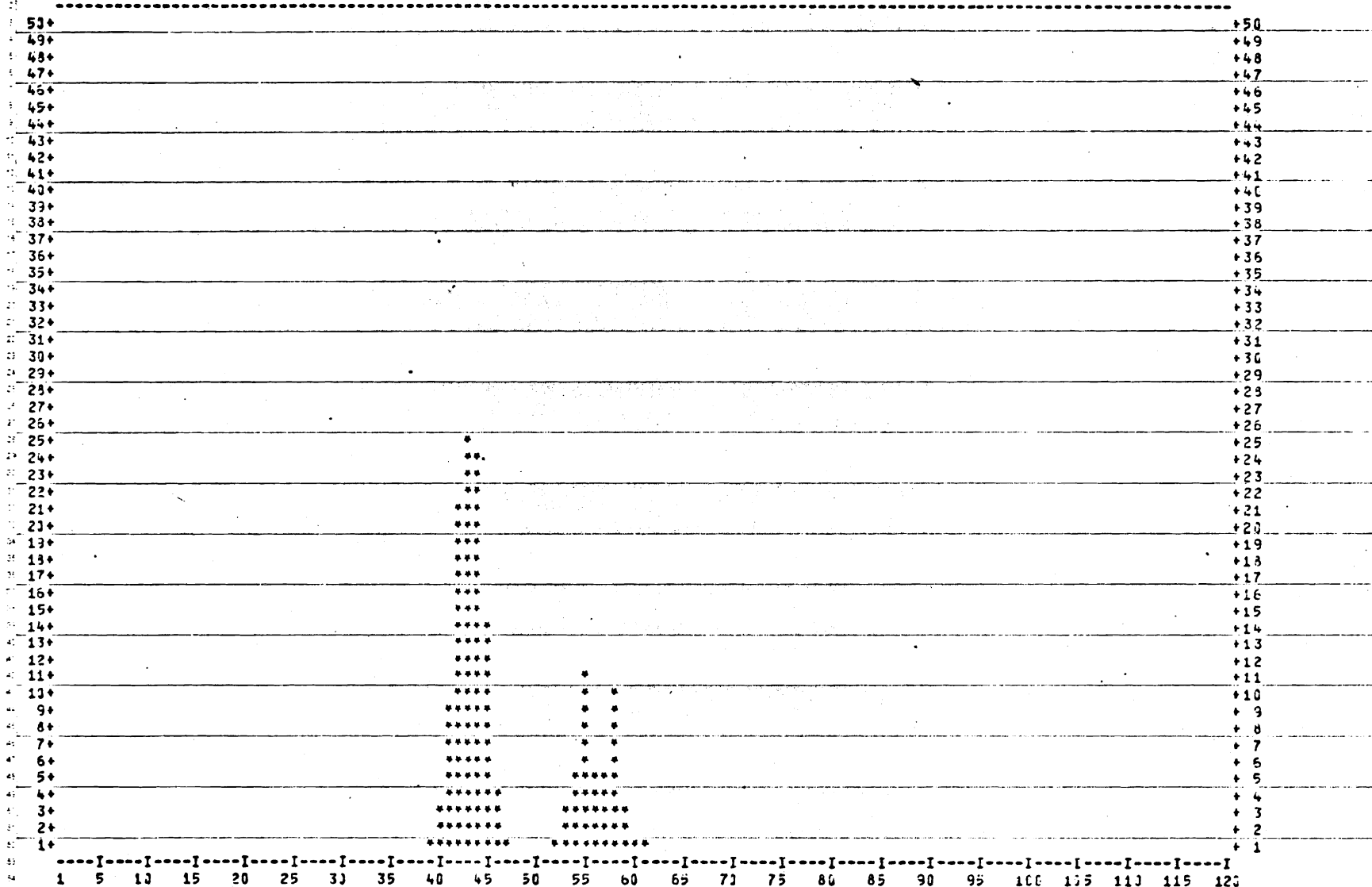
TOTAL NO. = 213 THE X-AXIS = LENGTH (CENTIMETERS)  
 MEAN = 29.446 STANDARD DEVIATION = 3.809

FIGURE 26. Length frequencies of halfmoon for May 1978.



LENGTH HISTOGRAM FOR PACIFIC BONITO (SARDA CHILIENSIS)  
DURING APRIL 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 2.0



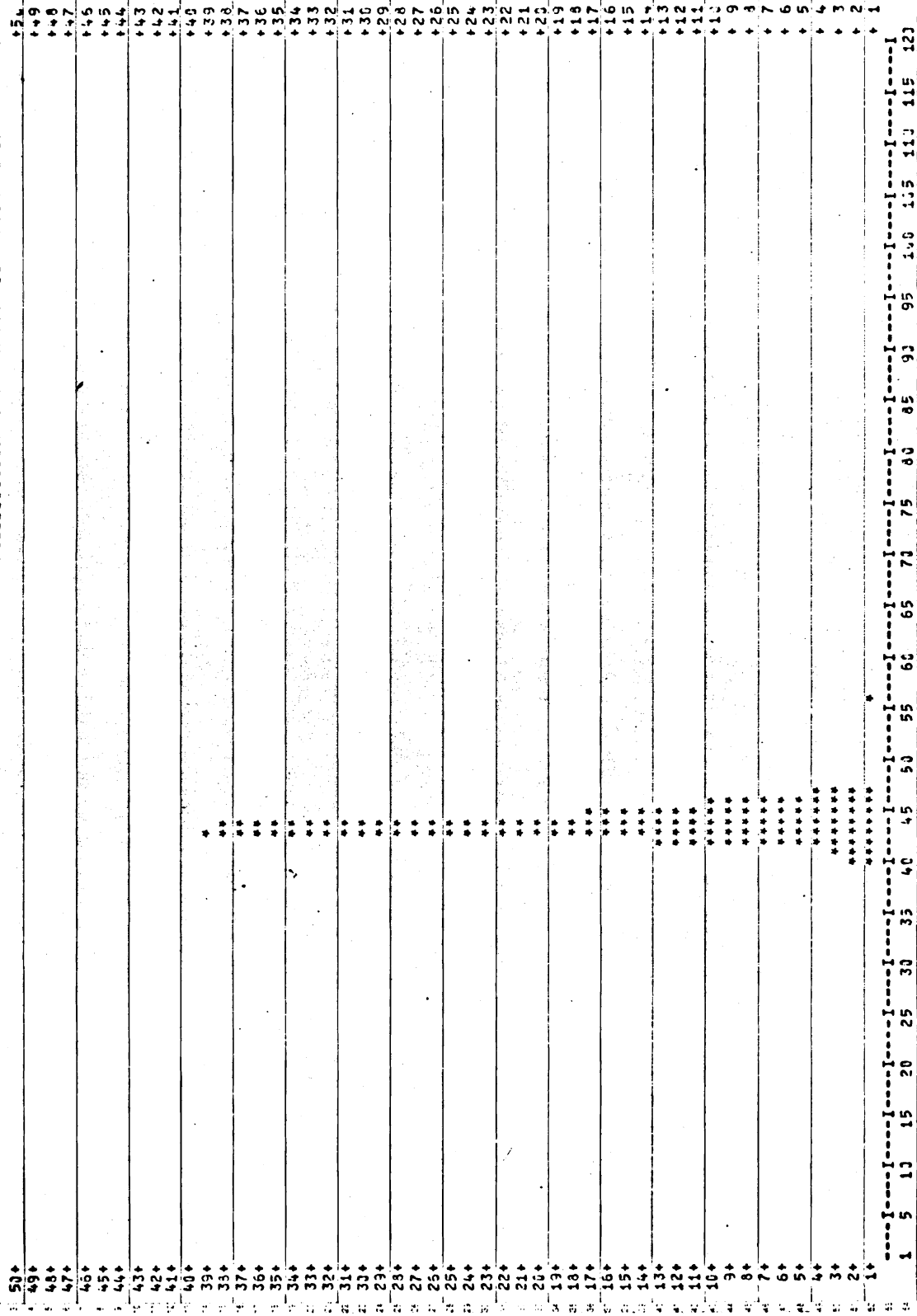
THE X-AXIS = LENGTH (CENTIMETERS)  
TOTAL NO. = 337    MEAN = 47.238    STANDARD DEVIATION = 6.339

FIGURE 28. Length frequencies of Pacific bonito for April 1978.



LENGTH HISTOGRAM FOR PACIFIC BONITO (SARDA CHILIENSIS)  
DURING MAY 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 2.0



TOTAL NO. = 265 THE X-AXIS = LENGTH (CENTIMETERS)  
MEAN = 43.147 STANDARD DEVIATION = 2.777

FIGURE 29. Length frequencies of Pacific bonito for May 1978.

LENGTH HISTOGRAM FOR PACIFIC BONITO (SARDA CHILIENSIS)  
DURING JUNE 1978.

THE Y-AXIS = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1.0

Length (cm)	Frequency
50+	154
49+	149
48+	148
47+	147
46+	146
45+	145
44+	144
43+	143
42+	142
41+	141
40+	140
39+	139
38+	138
37+	137
36+	136
35+	135
34+	134
33+	133
32+	132
31+	131
30+	130
29+	129
28+	128
27+	127
26+	126
25+	125
24+	124
23+	123
22+	122
21+	121
20+	120
19+	119
18+	118
17+	117
16+	116
15+	115
14+	114
13+	113
12+	112
11+	111
10+	110
9+	109
8+	108
7+	107
6+	106
5+	105
4+	104
3+	103
2+	102
1+	101

TOTAL NO. = 155 THE X-AXIS = LENGTH (CENTIMETERS)  
MEAN = 46.987 STANDARD DEVIATION = 2.356

FIGURE 30. Length frequencies of Pacific bonito for June 1978.  
Total No. Quarter 729 Mean Length Quarter 46.058 cm

LENGTH HISTOGRAM FOR SENYONEMUS LINEATUS (WHITE CROAKER)  
 DURING APRIL 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 2.0

58*	58
49*	49
48*	48
47*	47
46*	46
45*	45
44*	44
43*	43
42*	42
41*	41
40*	40
39*	39
38*	38
37*	37
36*	36
35*	35
34*	34
33*	33
32*	32
31*	31
30*	30
29*	29
28*	28
27*	27
26*	26
25*	25
24*	24
23*	23
22*	22
21*	21
20*	20
19*	19
18*	18
17*	17
16*	16
15*	15
14*	14
13*	13
12*	12
11*	11
10*	10
9*	9
8*	8
7*	7
6*	6
5*	5
4*	4
3*	3
2*	2
1*	1
1	1
5	5
10	10
15	15
20	20
25	25
30	30
35	35
40	40
45	45
50	50
55	55
60	60
65	65
70	70
75	75
80	80
85	85
90	90
95	95
100	100
105	105
110	110
115	115
120	120

TOTAL NO. = 308 THE X-AXIS = LENGTH (CENTIMETERS)  
 MEAN = 27.988 STANDARD DEVIATION = 2.646

FIGURE 31. Length frequencies of white croaker for April 1978.

LENGTH HISTOGRAM FOR GENYONEMUS LINEATUS (WHITE CROAKER)  
DURING MAY 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 2.0

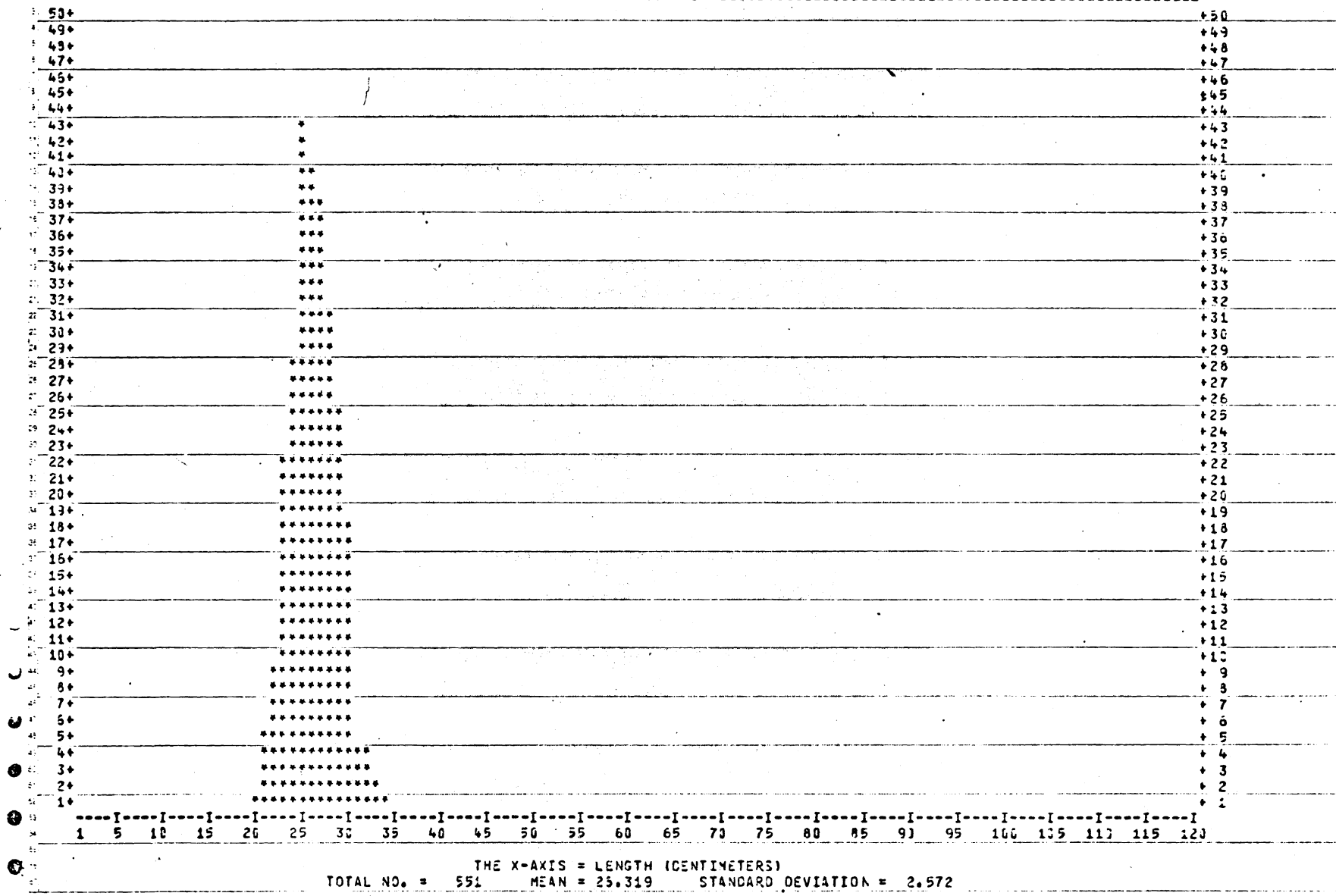


FIGURE 32. Length frequencies of white croaker for May 1978.

LENGTH HISTOGRAM FOR *GENYONEMUS LINEATUS* (WHITE CROAKER)  
DURING JUNE 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 3.0

Length (cm)	Frequency
1	1
5	1
10	1
15	1
20	1
25	1
30	1
35	1
40	1
45	1
50	1
55	1
60	1
65	1
70	1
75	1
80	1
85	1
90	1
95	1
100	1
105	1
110	1
115	1
120	1
125	1
130	1
135	1
140	1
145	1
150	1
155	1
160	1
165	1
170	1
175	1
180	1
185	1
190	1
195	1
200	1
205	1
210	1
215	1
220	1
225	1
230	1
235	1
240	1
245	1
250	1
255	1
260	1
265	1
270	1
275	1
280	1
285	1
290	1
295	1
300	1
305	1
310	1
315	1
320	1
325	1
330	1
335	1
340	1
345	1
350	1
355	1
360	1
365	1
370	1
375	1
380	1
385	1
390	1
395	1
400	1
405	1
410	1
415	1
420	1
425	1
430	1
435	1
440	1
445	1
450	1
455	1
460	1
465	1
470	1
475	1
480	1
485	1
490	1
495	1
500	1

TOTAL NO. = 300      THE X-AXIS = LENGTH (CENTIMETERS)  
MEAN = 25.770      STANDARD DEVIATION = 2.730

FIGURE 33. Length frequencies of white croaker for June 1978.  
Total No. Quarter 1,759    Mean Length Quarter 26.838 cm



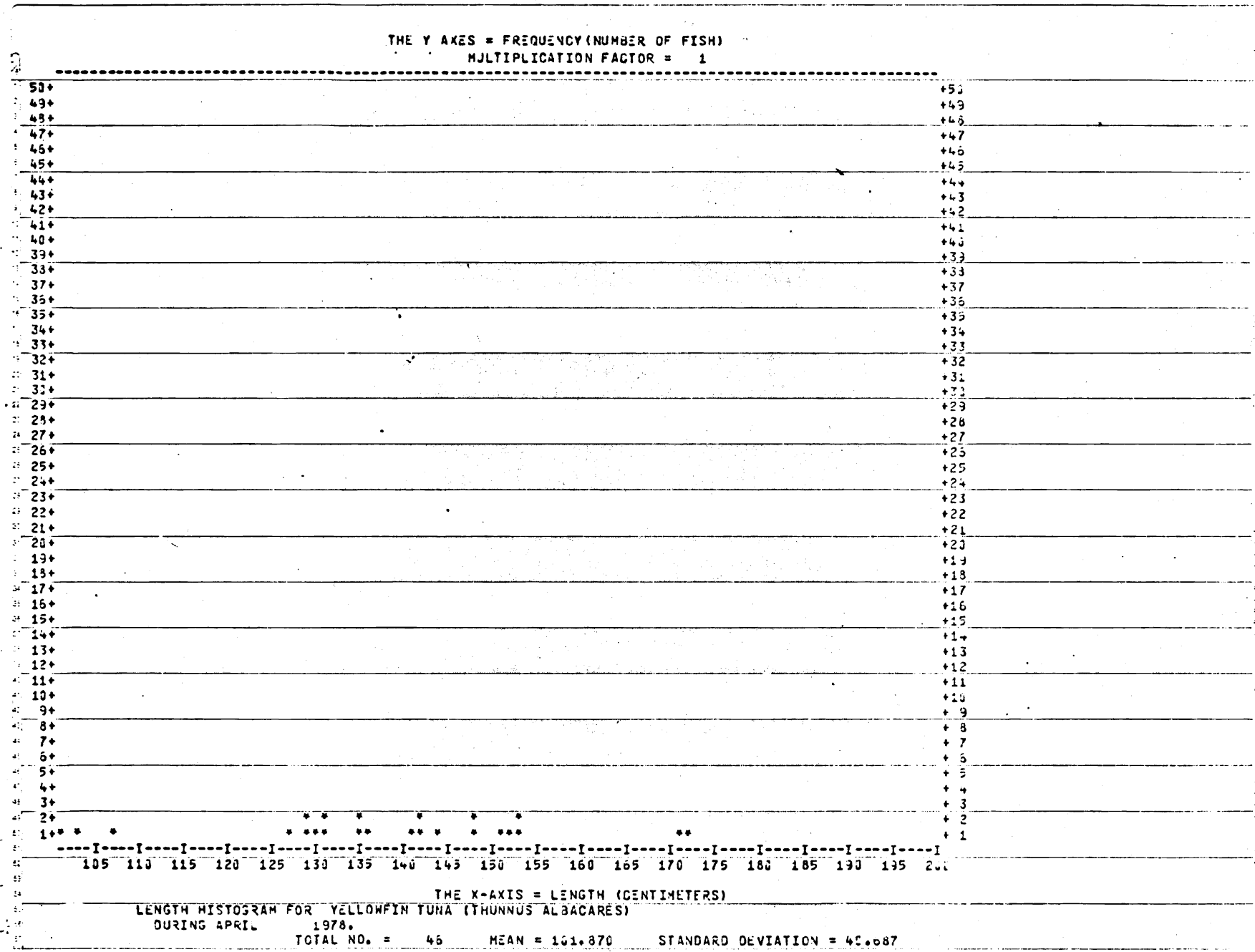
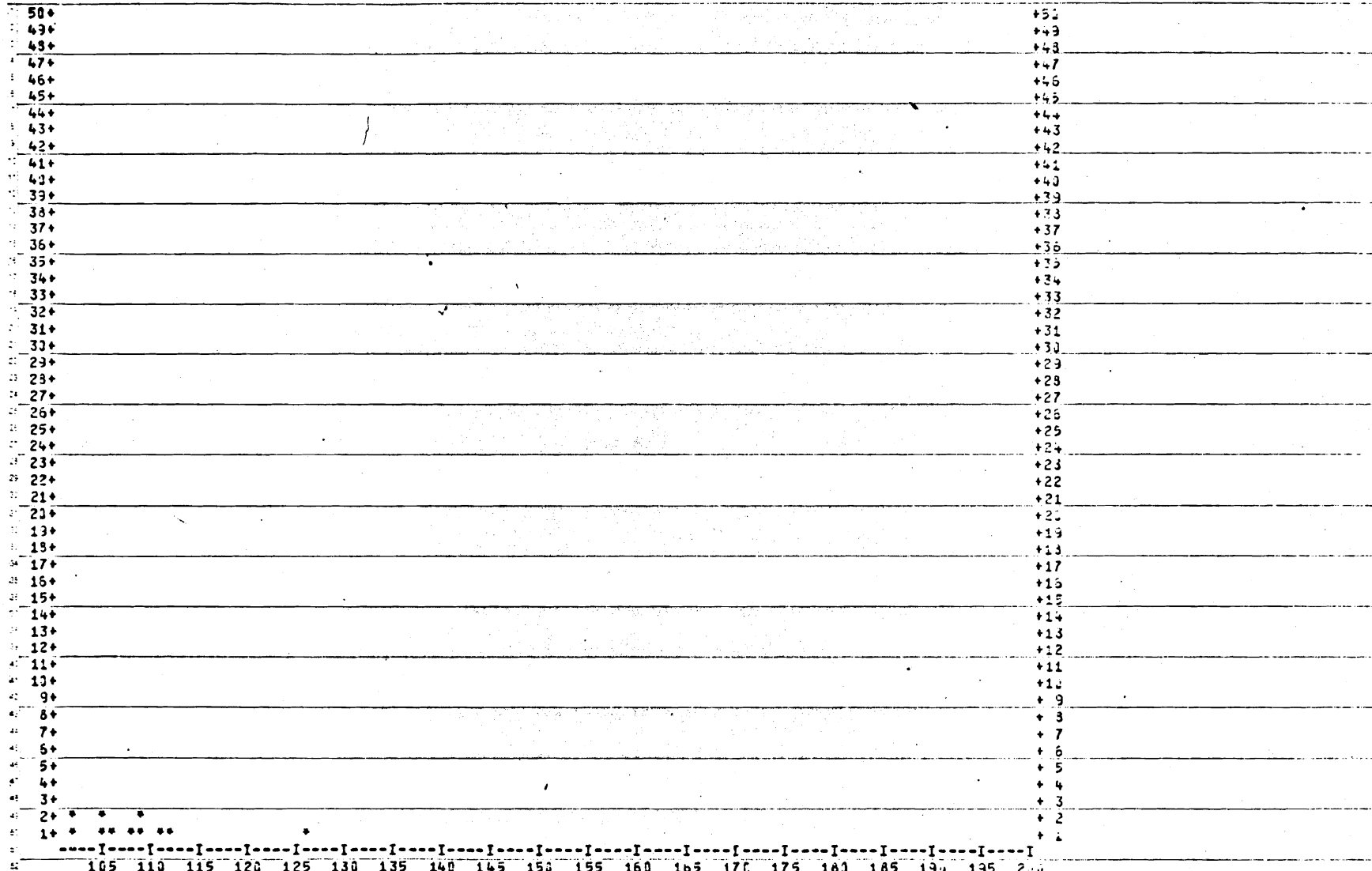


FIGURE 34. Length frequencies of yellowfin tuna for April 1978.





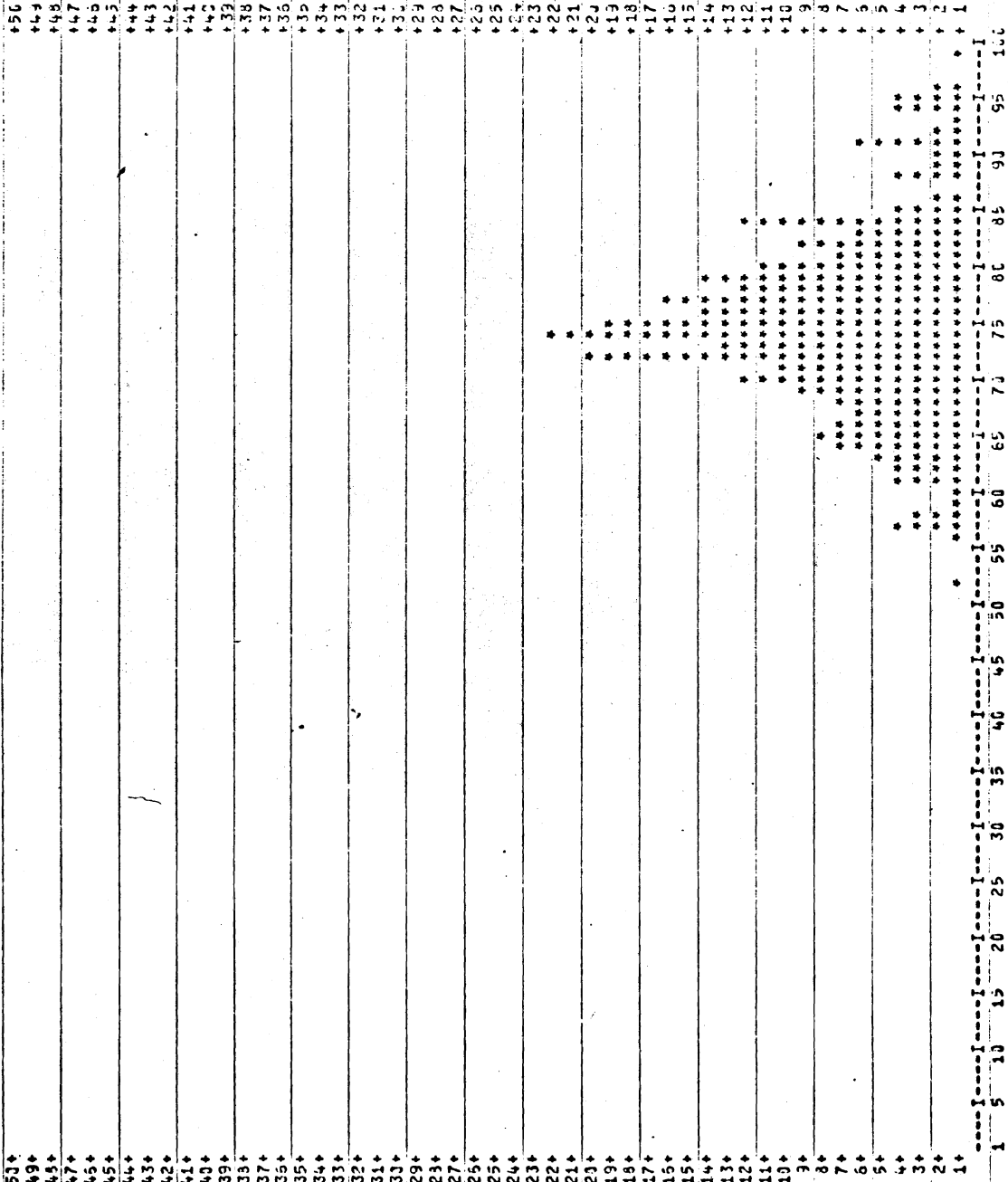
THE Y AXIS = FREQUENCY (NUMBER OF FIS-1)  
 MULTIPLICATION FACTOR = 1



THE X-AXIS = LENGTH (CENTIMETERS)  
 LENGTH HISTOGRAM FOR YELLOWFIN TUNA (THUNNUS ALBACARES)  
 DURING MAY 1978.  
 TOTAL NO. = 59 MEAN = 82.356 STANDARD DEVIATION = 15.607

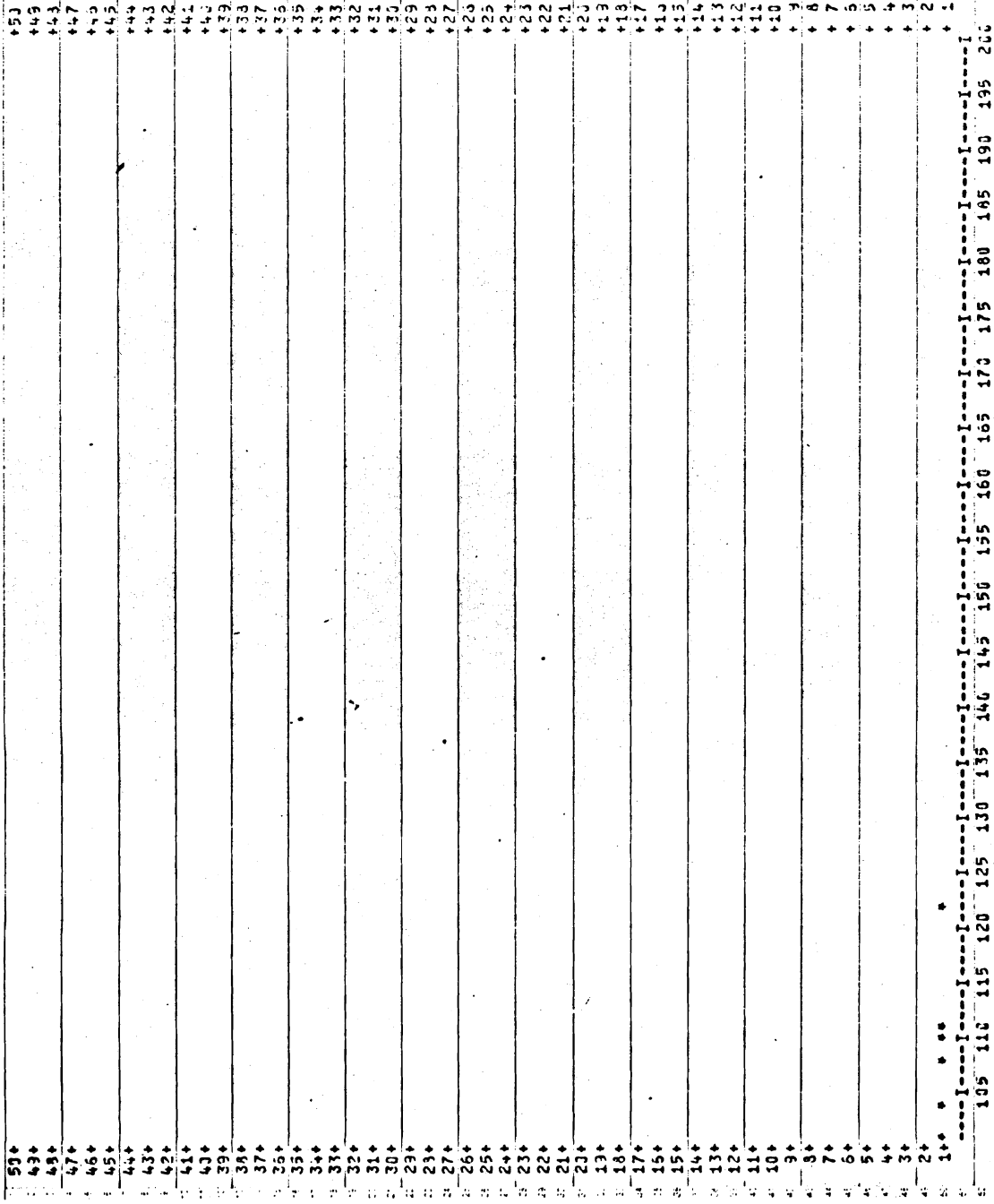
FIGURE 35. Length frequencies of yellowfin tuna for May 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1



THE X-AXIS = LENGTH (CENTIMETERS)

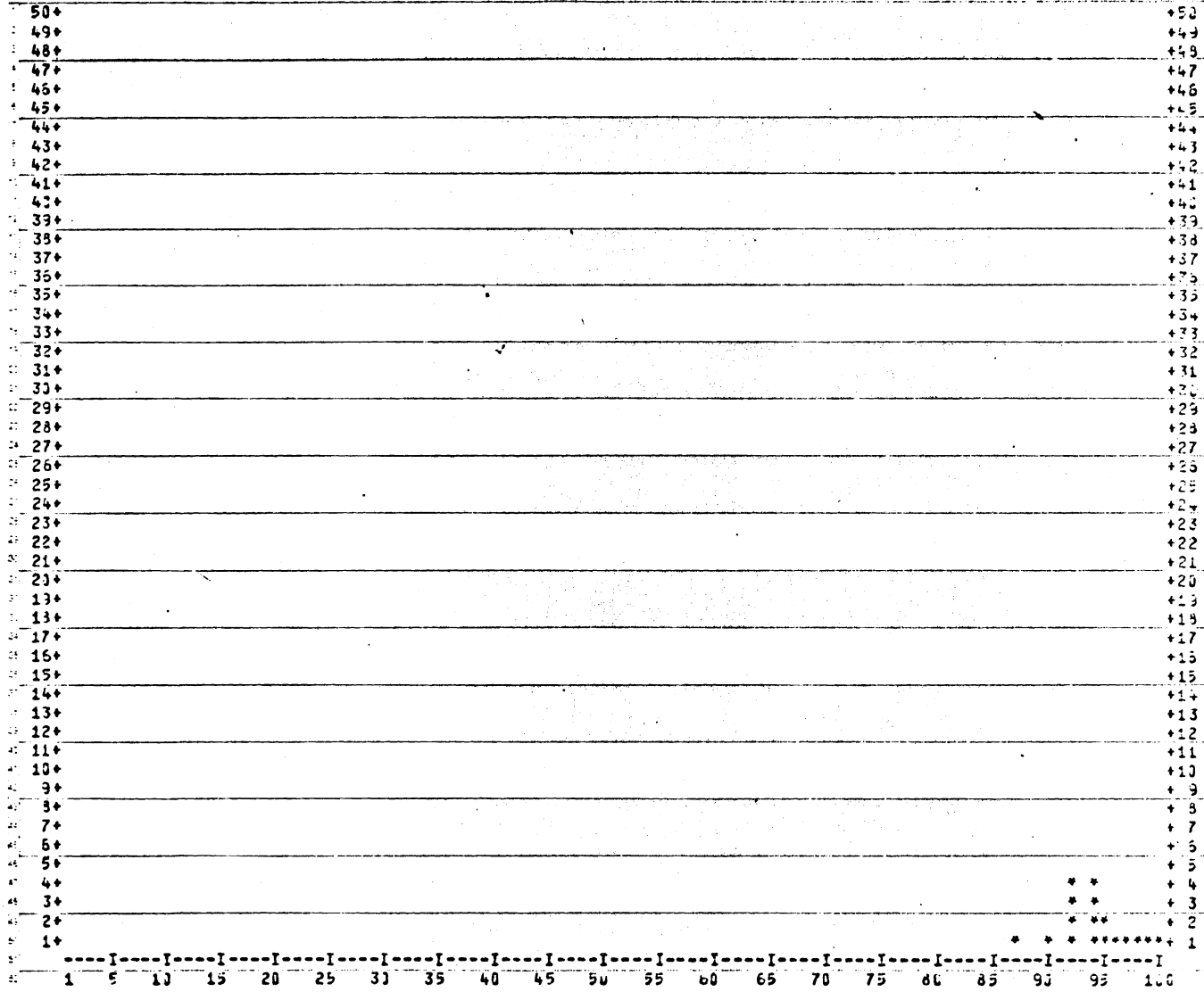
THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1



LENGTH HISTOGRAM FOR YELLOWFIN TUNA (THUNNUS ALBACARES)  
DURING JUNE 1978.  
TOTAL NO. = 305 MEAN = 75.849 STANDARD DEVIATION = 9.691

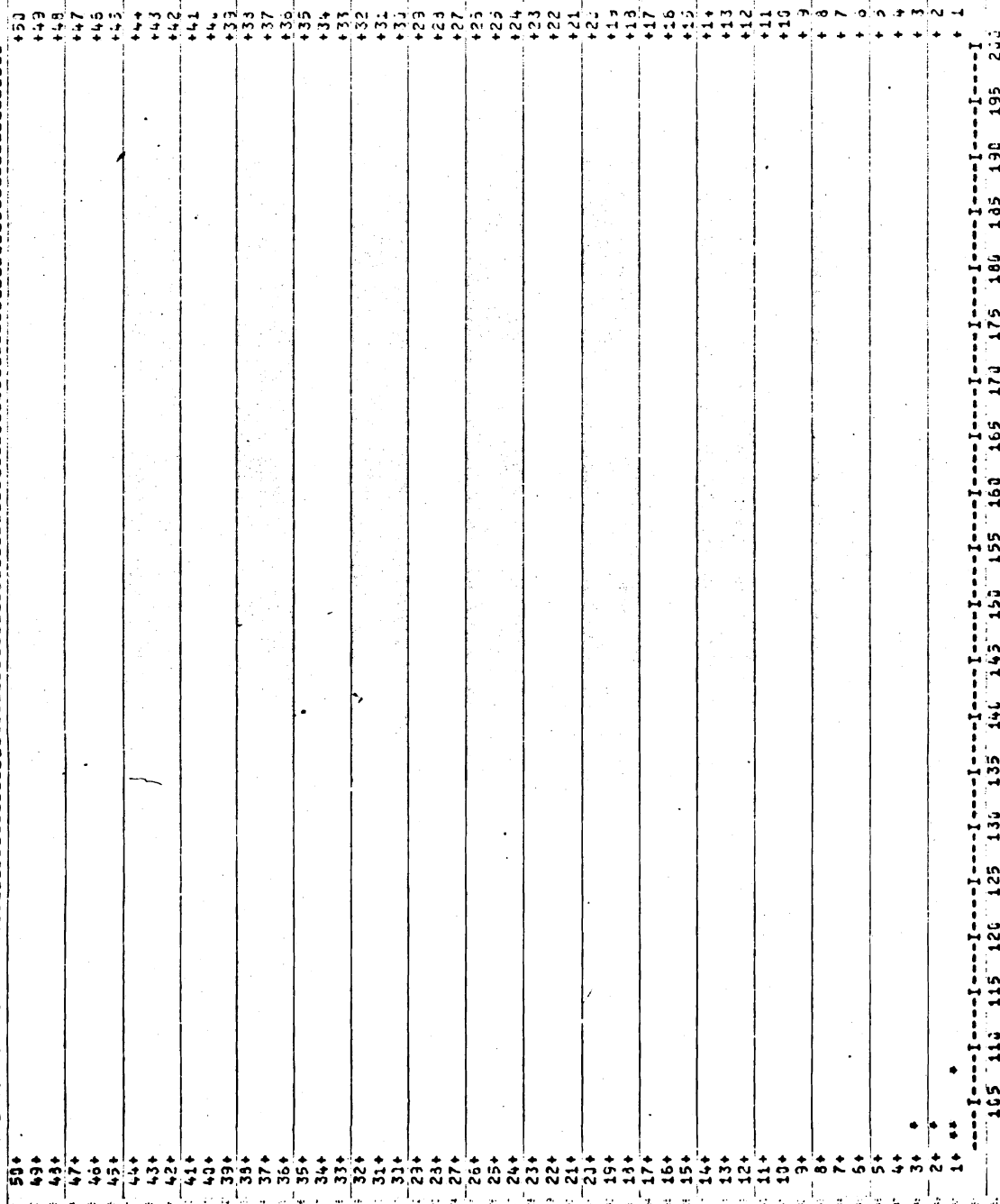
FIGURE 36. Length frequencies of yellowfin tuna for June 1978.  
Total No. Quarter 410 Mean Length Quarter 79.704 cm

THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1



THE X-AXIS = LENGTH (CENTIMETERS)

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1

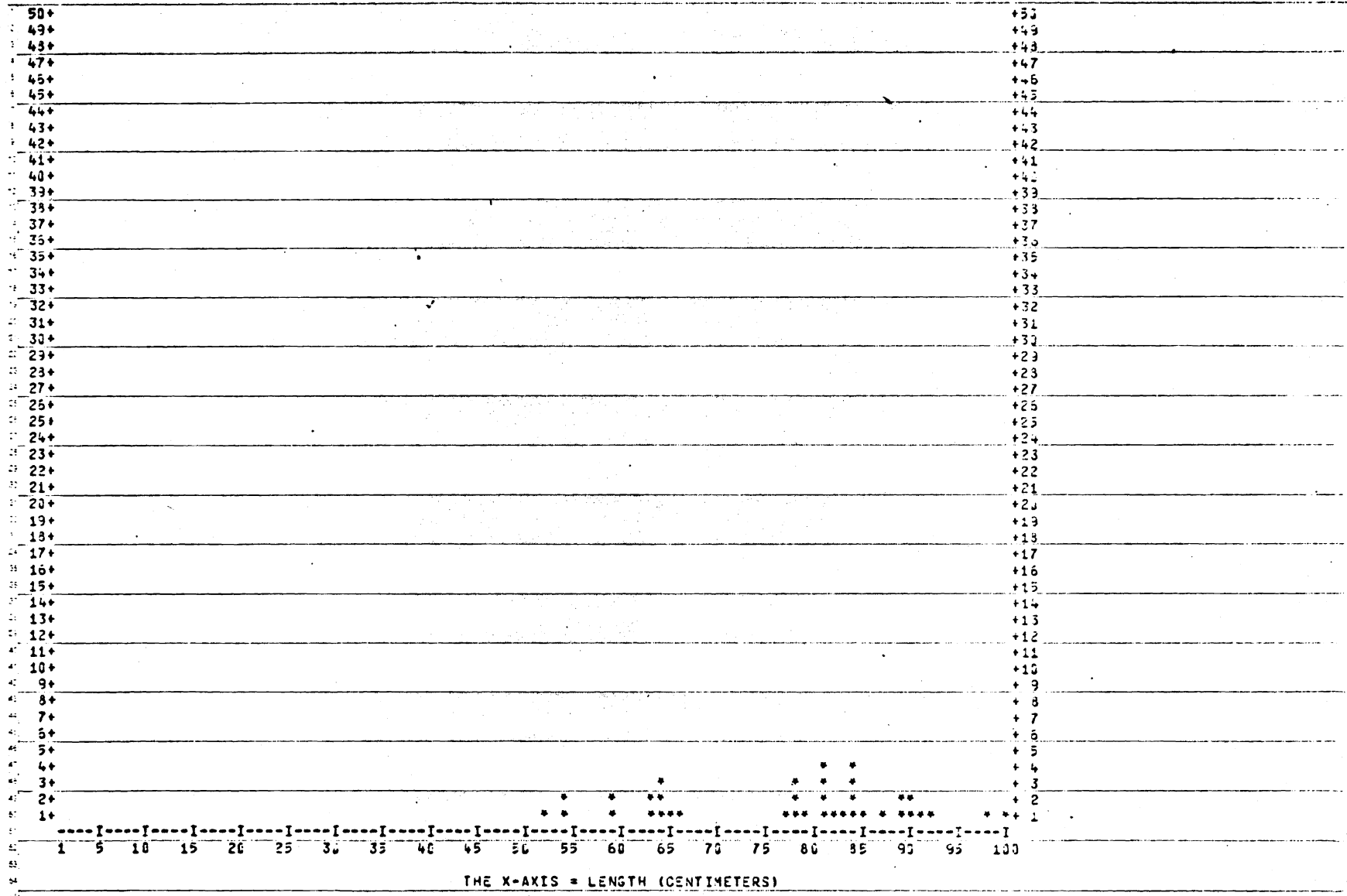


LENGTH HISTOGRAM FOR YELLOWTAIL (SERIOLA DORSALIS)  
DURING APRIL 1978.

TOTAL NO. = 22 MEAN = 96.364 STANDARD DEVIATION = 5.014

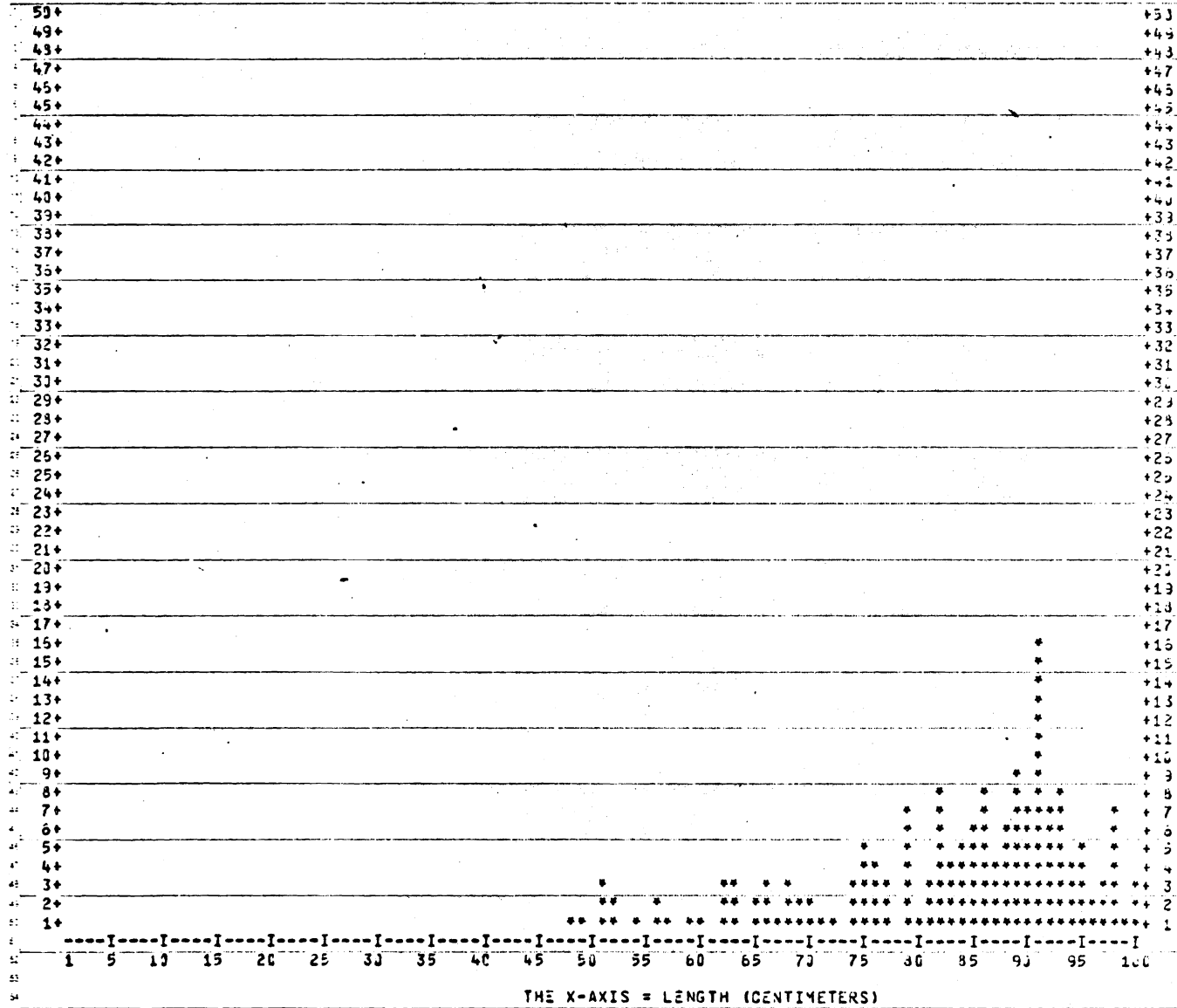
FIGURE 37. Length frequencies of yellowtail for April 1978.

THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1



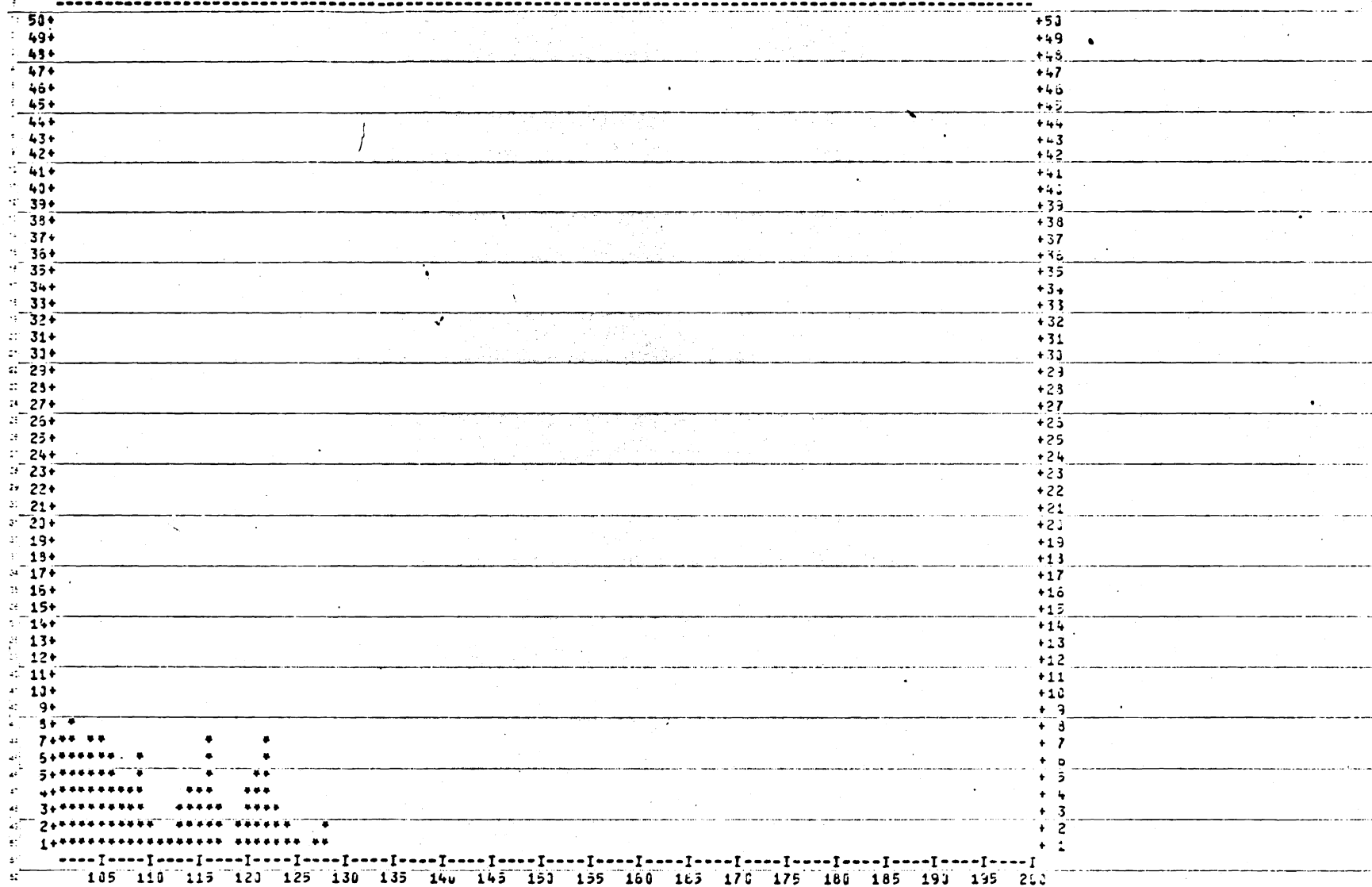


THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1





THE Y AXES = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1



THE X-AXIS = LENGTH (CENTIMETERS)  
 LENGTH HISTOGRAM FOR YELLOWTAIL (SERIOLA DORSALIS)  
 DURING JUNE 1978.  
 TOTAL NO. = 28. MEAN = 93.543 STANDARD DEVIATION = 17.751

FIGURE 39. Length frequencies of yellowtail for June 1978.  
 Total No. Quarter 341 Mean Length Quarter 92.096

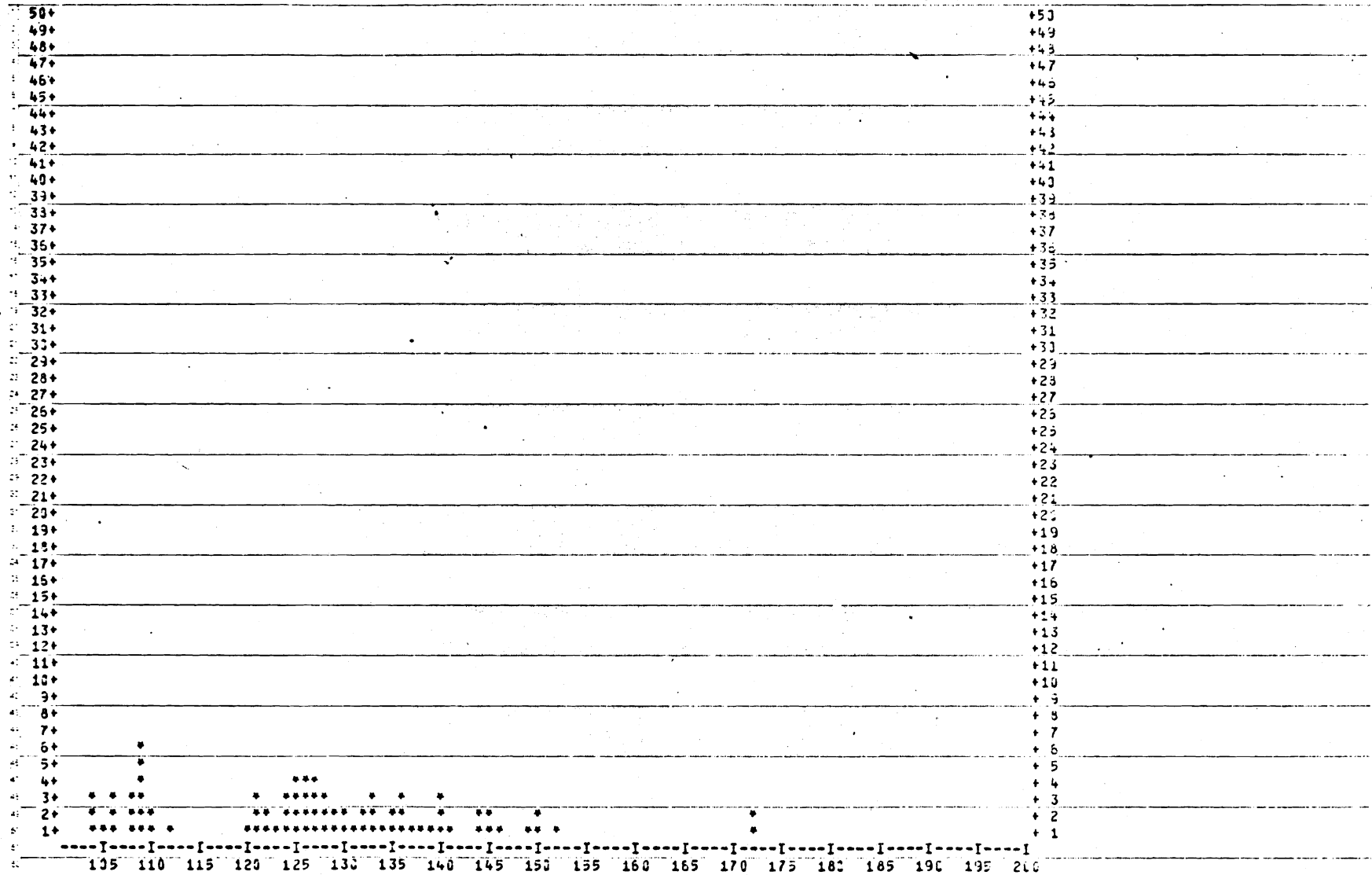
THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1

50+	50
49+	49
43+	43
37+	37
45+	45
44+	44
43+	43
42+	42
41+	41
40+	40
39+	39
38+	38
37+	37
35+	35
35+	35
34+	34
33+	33
32+	32
31+	31
30+	30
29+	29
28+	28
27+	27
26+	26
25+	25
24+	24
23+	23
22+	22
21+	21
21+	21
19+	19
19+	19
17+	17
15+	15
15+	15
14+	14
13+	13
12+	12
11+	11
10+	10
9+	9
7+	7
6+	6
5+	5
4+	4
3+	3
2+	2
1+	1

THE X-AXIS = LENGTH (CENTIMETERS)

1 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1



THE X-AXIS = LENGTH (CENTIMETERS)  
 LENGTH HISTOGRAM FOR WAHOO (ACANTHOCYBIUM SOLANDERII)  
 DURING APRIL 1978.  
 TOTAL NO. = 79 MEAN = 126.911 STANDARD DEVIATION = 15.10.

FIGURE 40. Length frequencies of wahoo for April 1978.



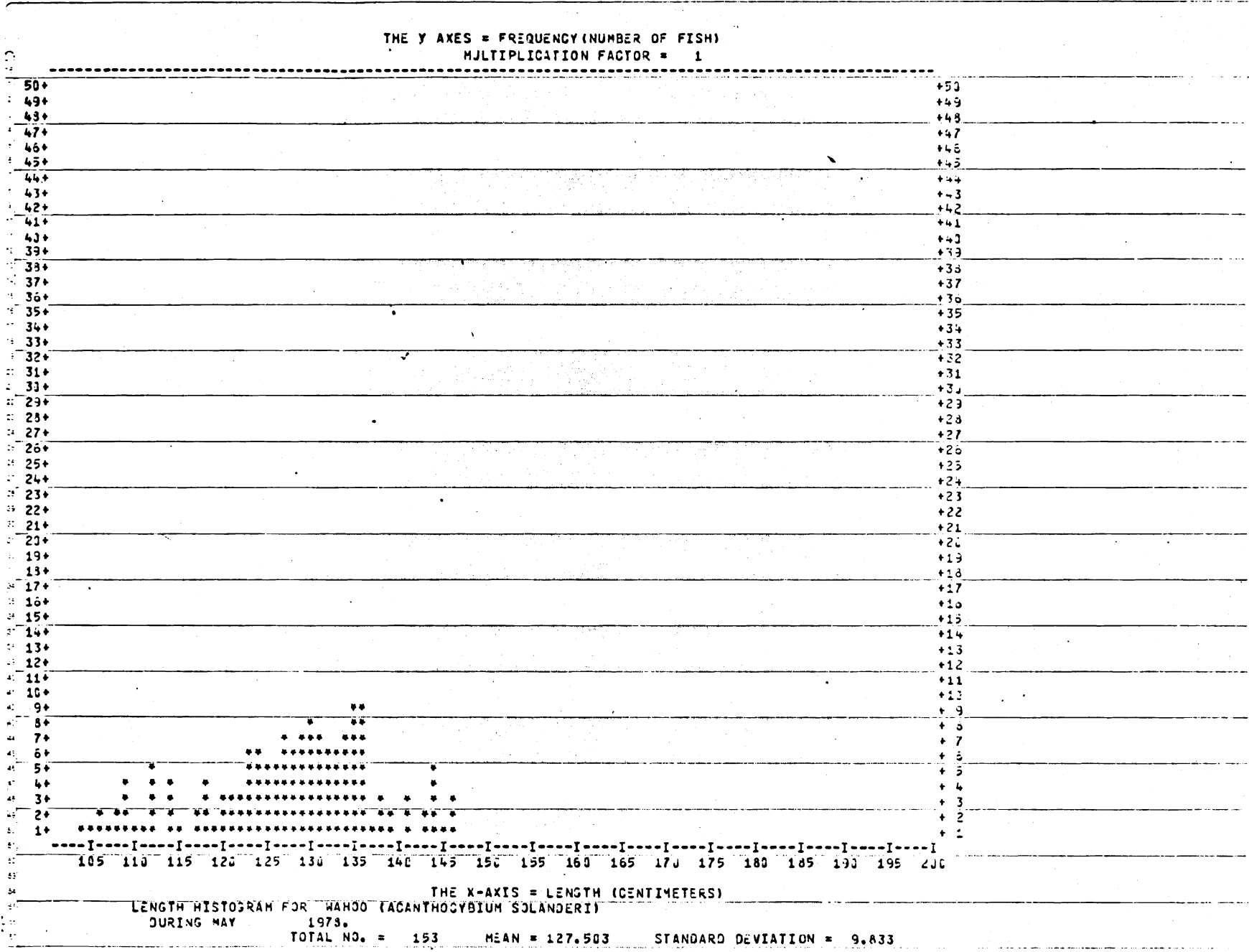


FIGURE 41. Length frequencies of wahoo for May 1978.

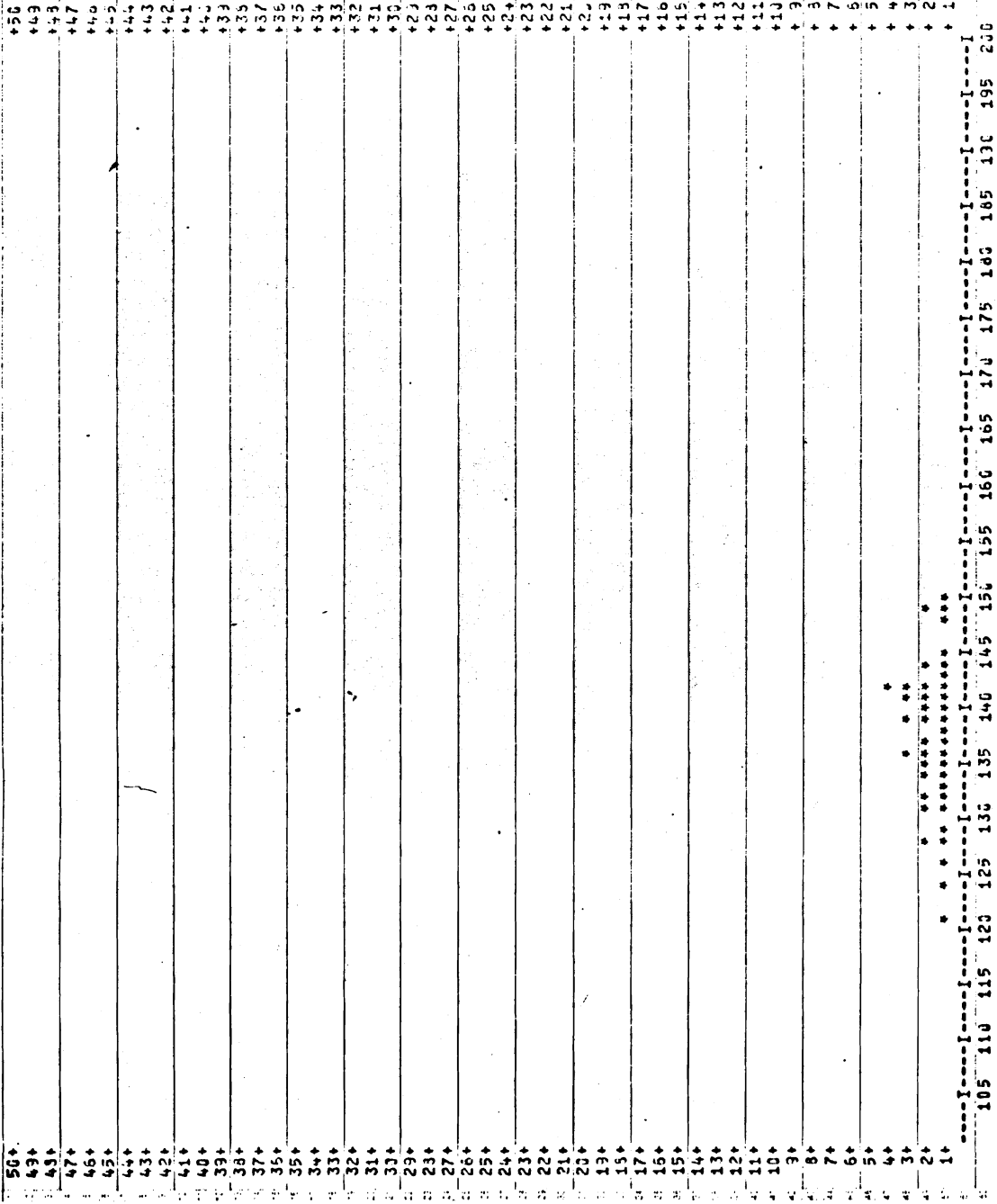
THE Y AXES = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1

50+	23
49+	29
48+	38
47+	47
46+	46
45+	45
44+	44
43+	43
42+	42
41+	41
40+	40
39+	39
38+	38
37+	37
36+	36
35+	35
34+	34
33+	33
32+	32
31+	31
30+	30
29+	29
28+	28
27+	27
26+	26
25+	25
24+	24
23+	23
22+	22
21+	21
20+	20
19+	19
18+	18
17+	17
16+	16
15+	15
14+	14
13+	13
12+	12
11+	11
10+	10
9+	9
8+	8
7+	7
6+	6
5+	5
4+	4
3+	3
2+	2
1+	1

1 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

THE X-AXIS = LENGTH (CENTIMETERS)

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1



LENGTH HISTOGRAM FOR WAHOO (ACANTHOCYBIUM SOLANDERI)  
 DURING JUNE 1973.  
 TOTAL NO. = 41    MEAN = 137.398    STANDARD DEVIATION = 6.785

FIGURE 42. Length frequencies of wahoo for June 1978.  
 Total No. Quarter 273    Mean Length Quarter 128.816

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1

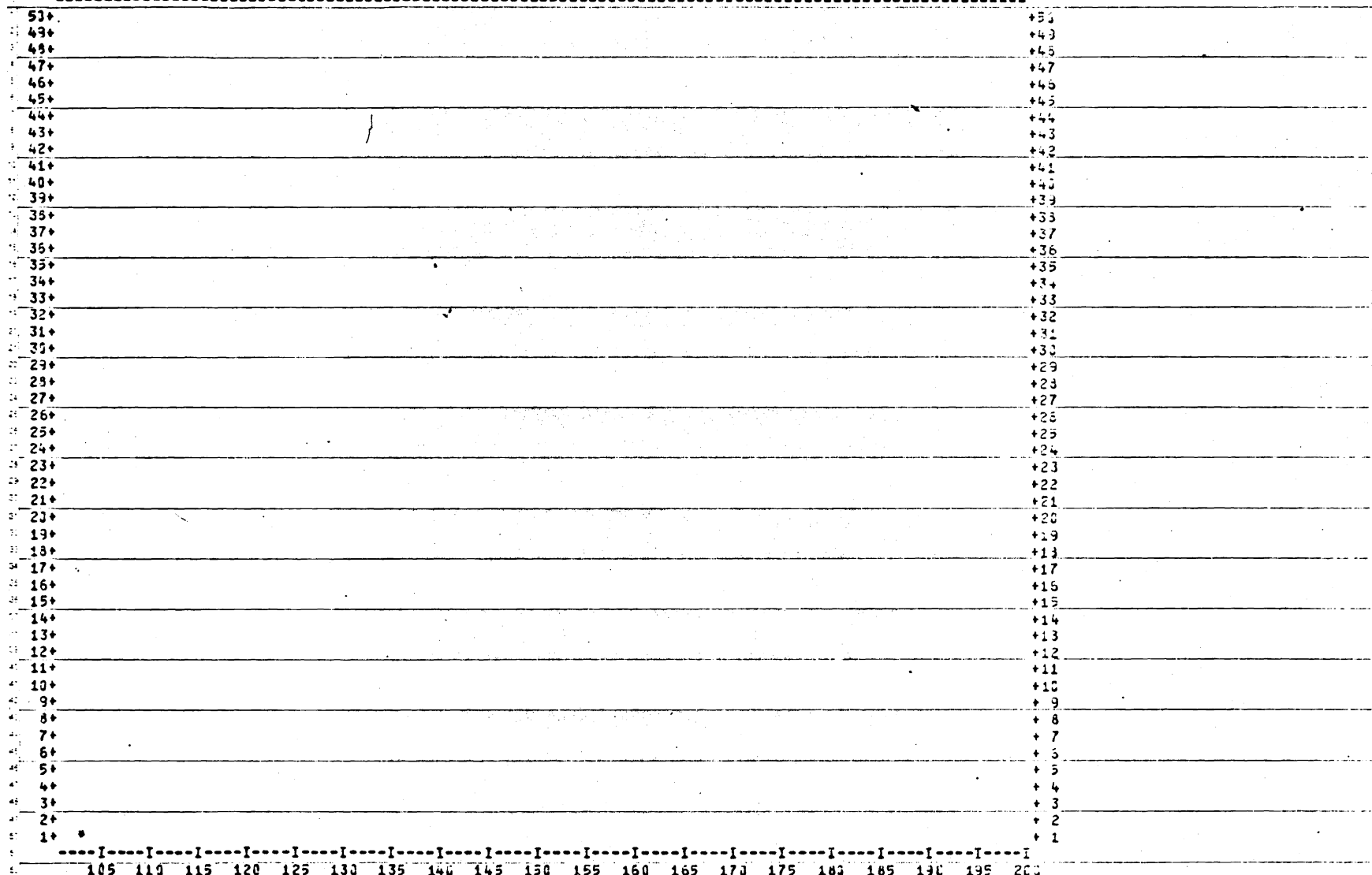
50	50
49	49
48	48
47	47
46	46
45	45
44	44
43	43
42	42
41	41
40	40
39	39
38	38
37	37
36	36
35	35
34	34
33	33
32	32
31	31
30	30
29	29
28	28
27	27
26	26
25	25
24	24
23	23
22	22
21	21
20	20
19	19
18	18
17	17
16	16
15	15
14	14
13	13
12	12
11	11
10	10
9	9
8	8
7	7
6	6
5	5
4	4
3	3
2	2
1	1

THE X-AXIS = LENGTH (CENTIMETERS)

1 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100



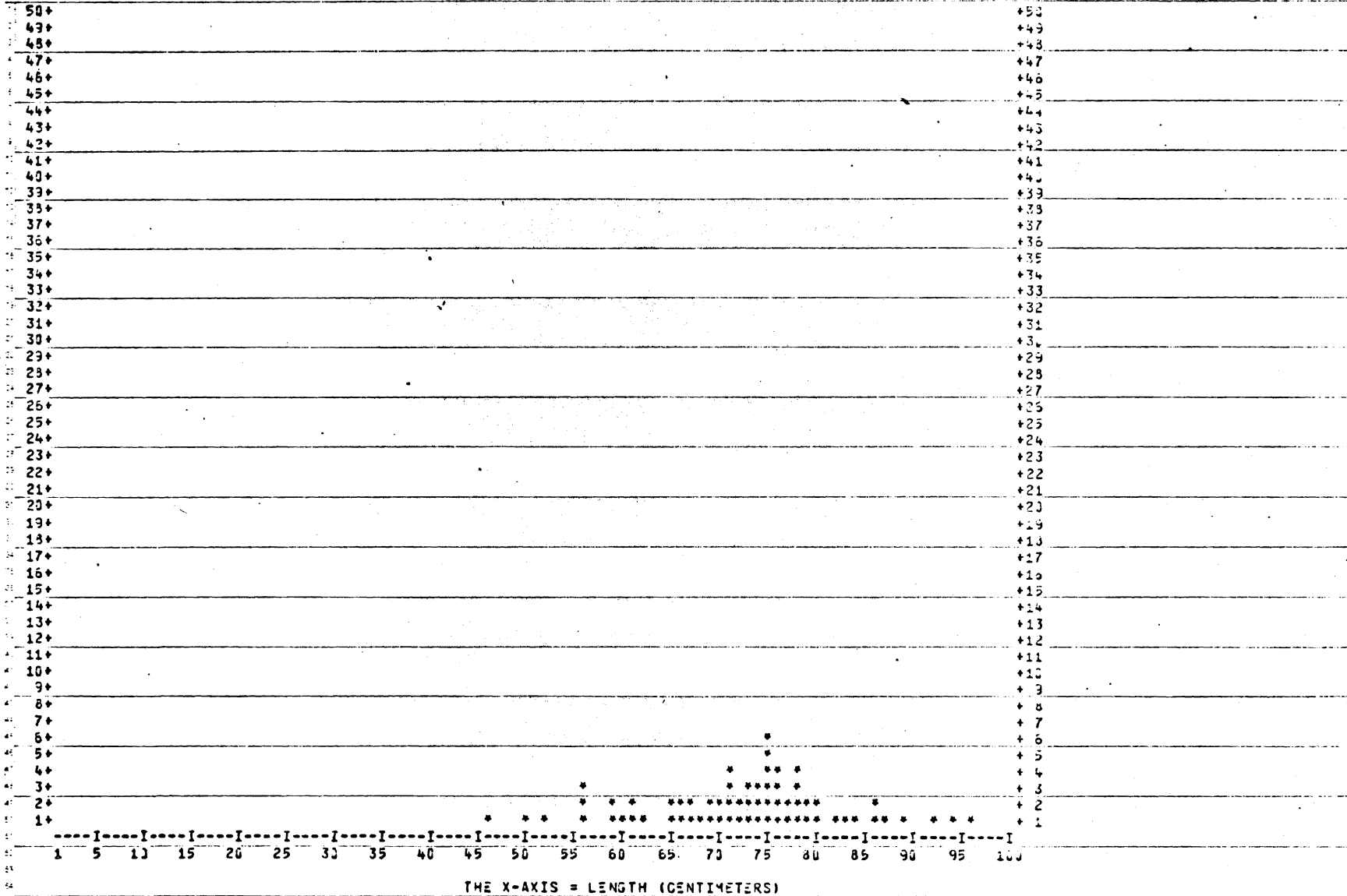
THE Y AXIS = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1



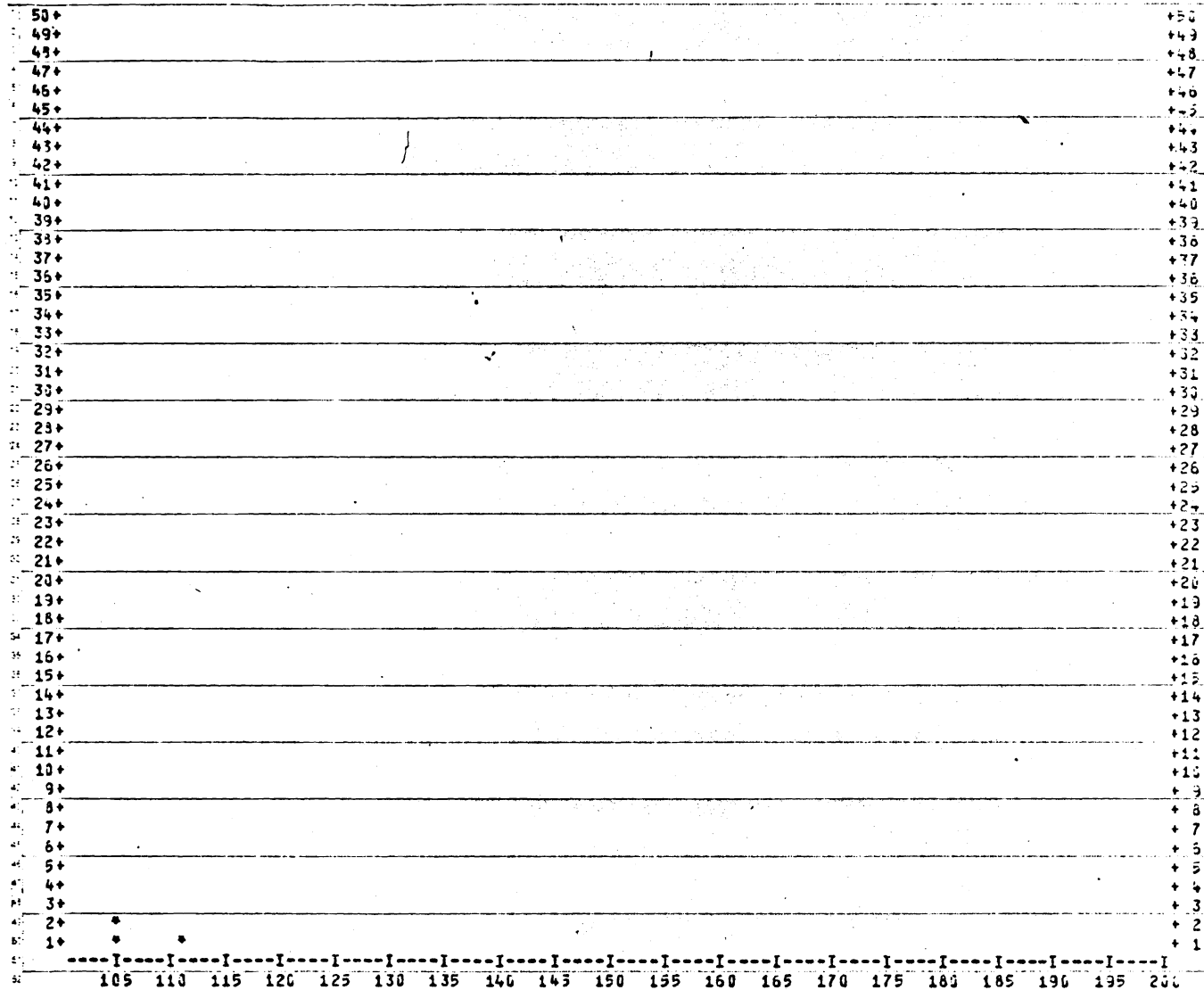
THE X-AXIS = LENGTH (CENTIMETERS)  
 LENGTH HISTOGRAM FOR EPINEPHLUS NIVEATUS (SNOWY GROUPE)  
 DURING MAY 1978.  
 TOTAL NO. = 2 MEAN = 97.500 STANDARD DEVIATION = 5.500

FIGURE 43. Length frequencies of snowy grouper for May 1978.

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1



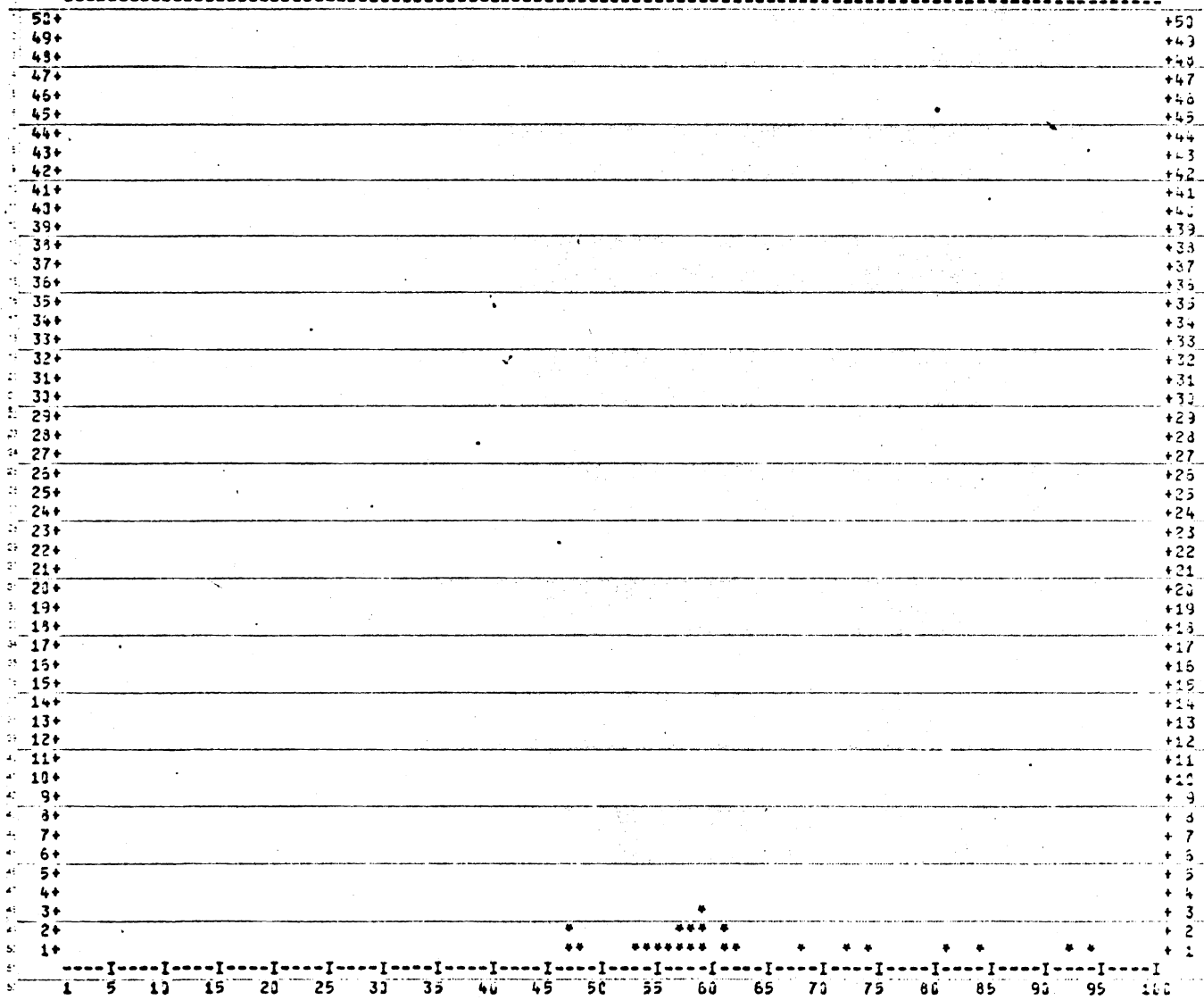
THE Y AXES = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1



THE X-AXIS = LENGTH (CENTIMETERS)  
 LENGTH HISTOGRAM FOR EPINEPHLUS NIVEATUS (SNOWY GROUPE)  
 DURING JUNE 1978.  
 TOTAL NO. = 68 MEAN = 73.926 STANDARD DEVIATION = 12.217

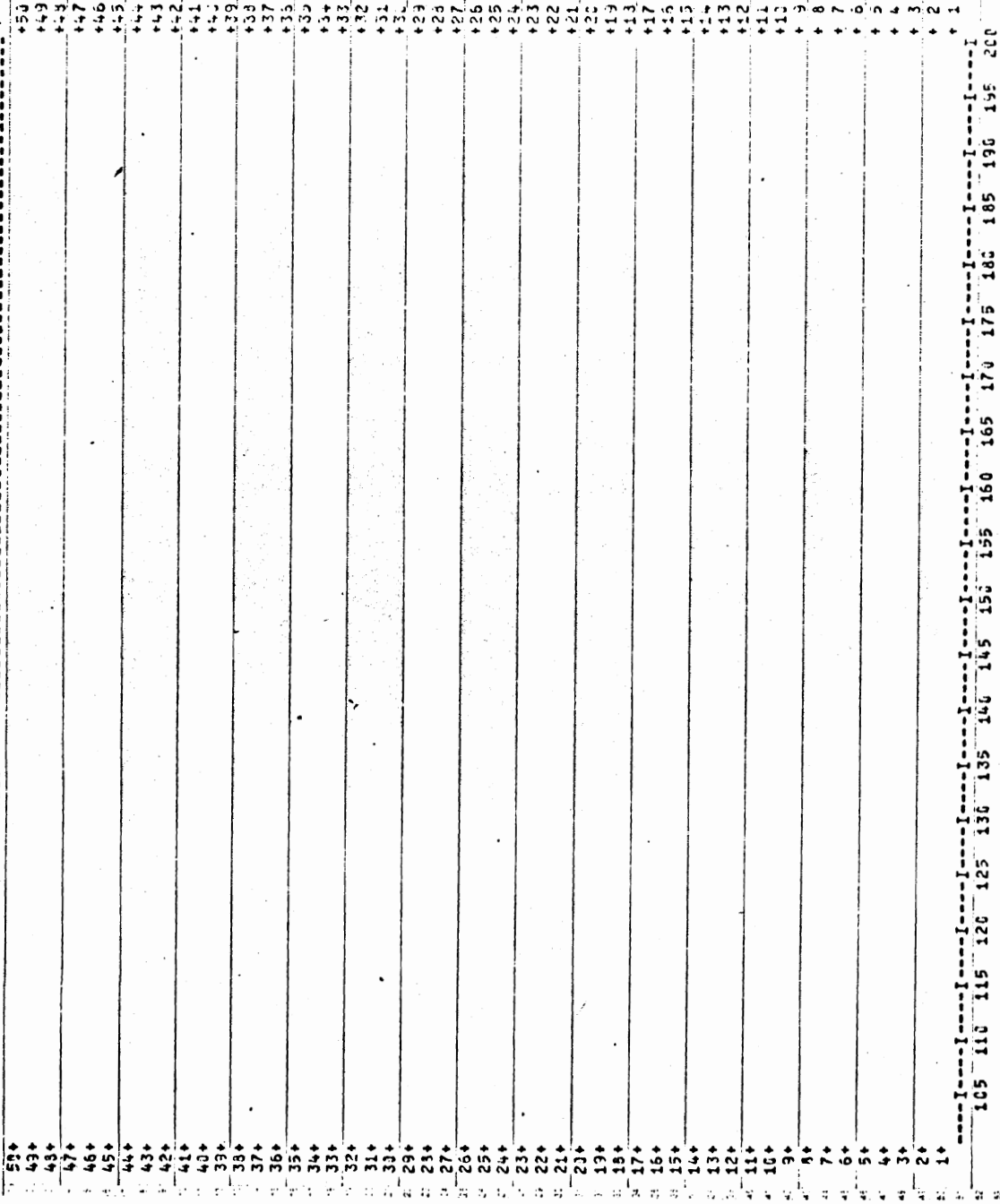
FIGURE 44. Length frequencies of snowy grouper for June 1978.  
 Total No. Quarter 70 Mean Length Quarter 74.599 cm

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
 MULTIPLICATION FACTOR = 1



THE X-AXIS = LENGTH (CENTIMETERS)

THE Y AXES = FREQUENCY (NUMBER OF FISH)  
MULTIPLICATION FACTOR = 1



LENGTH HISTOGRAM FOR EPINEPHLUS DERMATOLEPIS (LEATHER BASS)  
DURING APRIL 1978.

TOTAL NO. = 24      MEAN = 63.167      STANDARD DEVIATION = 12.915

FIGURE 45. Length frequencies of leather bass for April 1978.